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Habits and Skills Among Cerebral Palsy Children

Grizzelle M. Norfleet, M.A.

Thorndike[1] states that any skill means a certain way of response to a certain situation and a connection or bond whereby the former is the result of the latter. Any fact of intellect or character depends upon the environment to which a child can adapt himself. So, in selecting a child in whom you hope to develop skills in the broader sense of the word, you must not only consider his response to his environment but also what limitations the environment will offer. This environment must not be made too easy for him. According to Thorndike, man modifies or changes his environment and this also changes man.

This change, or reaction, between man and his environment is what is known as education. Wisdom and economy in improving man's wants and in making him better able to satisfy them depend upon knowledge—first, of what nature is, apart from education; and second, of the laws which govern changes in it. It is the province of educational psychology to give such knowledge of the original nature of man, and, likewise, of the laws of modifiability or learning in the cases of intellect, character and skill.

Learning takes place through activity; mind grows out of activity. This statement was made in regard to the child who can adequately respond to his environment, with a motor system intact for ingoing and outgoing stimuli which the environment offers. But in the child with a motor disability the desired act is diffused as nerve impulses reach impaired nervous tissue which functions to control the motor system. We consider this child as an injured person who has the normal power for thought processes. There must be careful guiding on the part of the teacher in order for learning to take place and for what is learned to be expressed.

The type of child under discussion has come to the attention of every physical therapist, chiefly as a problem in muscle training or developing motor skills. It is the purpose of this paper to draw attention to theories underlying the training of a "spastic child" with individual cases in mind, and to relate the theories to the child's personality make-up, along with—and over and above—the "stiff muscles" which are the therapist's chief concern.

The type of response made to a given situation depends on the organization of the neurones, which are inborn. In the children under our consideration there is not a normal motor outlet for their inborn organization or unlearned tendencies. In many of our cases there is lack of muscle control, not only of laryngeal movement for articulated speech but also of the mechanism of whispered speech, through inability to use muscles controlling cheek, tongue, throat, jaw, and the like. This is the case with a child in our school who can acquire the comprehensive reading skills quicker than any other child in the room. This is checked by having her place a paper over all but the correct phrase. However, it is very necessary to build up the environment which the child can master, so as to build up

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speech skills along with other vehicles of learning.

We find a great fear accompanying these muscle blocks. Therefore, we go to our behaviorist, John B. Watson[2], for the study of fear to aid in creating an environment for adequate response of the neurone organization to loud sound and the loss of support.

As an environment conducive to this process, the house for the education of these children is carpeted where practical. There are rails for support along the stairs, the walls of living quarters, dining room, play room, playgrounds, et cetera. All tables and chairs are well supported to give the children the feeling of security as they learn the manipulated skills. The school room also is arranged to give each child the support which eliminates fear. Each chair and desk is built to meet the child's particular motor limitation. We have gross-form boards with broad cork stoppers which can be shifted about to work out problems in mathematics. There are reading racks which support each book, and elastic to hold the pages securely in place while a child develops reading skills.

This calls for the dynamic approach, which is an inner change of the organism. The child is encouraged to explore his environment and to develop language in so doing. He has the power to select, and this is carefully guided by the teacher to build up as controlled a response as possible, not only from a motor standpoint but from the standpoint of concise thinking. This tends to bring the child nearer to normal thinking. One authority[3] says that self begins to be born when it is conscious of the act. One of our main objectives in the case of the child with a motor disability is the right way or the accepted way of doing an act or motion. The idea, the meaning of the thing, is how it interacts with the individual and his environment. In anticipation, the individual foresees the act. It becomes the responsibility of the intellect of the child in the sense of knowing the act and becoming responsible for it.

Before going further with theories concerning the education of a child with a motor disability, we must realize that there is no measurement for intelligence as an end in itself but only through some overt behavior, through facial muscles, or the use of one whole side, with face, neck, and laryngeal muscles left intact. But more often an imbalance of the entire musculature keeps this type of child from learning to do things that express systematic overt behavior which can be termed intelligence.

After creating an environment in which the child feels free to function within his limitation, we start up a learning process which will bring about habits and skills, with the accompanying royalties of health and appreciation of living. This is the inner change of the child's reaction to the environment and the child's ability to manage, control, or modify this environment. There are three theories of learning under which this change may take place, and under each theory there may be a workable hypothesis in building up intellectual and practical skills.

Let us go back to Watson[4] for a usable theory of learning for this type of child. Behavior must first be conditioned. In learning to manipulate objects we condition the extraneous movement by teaching, through feeling, sight, and sound for the simple desired movement. That is, if the child lacks balance in the hips because of a combined series of unnecessary motions, the simple forward-and-backward motion must be taught—flexion and extension of the hip joint conditioned to some rhythmical sound, like the beat of a metronome or something with a swing for a good easy walk. The limbs are put passively through these motions from the hips up and down, with the child lying on the table under a mirror which hangs from the ceiling.

The child's walk is next conditioned by placing him in an upright walker, where he can have the support of rails for his arms, with mirrors placed at both ends of the walker. Thus, the child can see the backward and forward swing from the hip.

This learning situation is very rigidly controlled, except for the association power. In the walker also, the motion is conditioned by some rhythmic sound inducive to the required motion. Our trial-and-error learning comes in when these conditions are removed. The child is put on his own actually to acquire the act of walking. He gradually learns that the goal for walking is more satisfying and more easily acquired when the direct motions are exercised or put into use. This connotes the experimental elimination of wrong choices. This is necessary before the motor-handicapped child can manipulate his upper or lower limbs, so as to react to his environment through the inner change which comes through the learning process, and through which the individual is not only modified by his environment but the environment is modified by the individual.

These children learn through experiment, though their functional experiences may be limited and rambling. Either by trial and error

or by conditioning, there is an adaptation which leads to problem solving. The first trial is not erased, however fumbling it may be because of limitation of use of the child's physical tools for learning. We may find responses to the total situation, and from these emerge response patterns upon which learning proceeds. For example, we have worked with one child who has no laryngeal or articulated control for speech, who nevertheless can show she has clearer insight into the reading lesson than any other child in the room.

From this point it might be well to go into the art work of this type of child. We must call it creative, as the motions and experiences have been too limited to go through the fundamental processes of acquiring the efficiency which the artistic expressions reveal. A boy of fifteen could not walk at all, but he could illustrate the covers of our school magazine. Each cover revealed some amazing feeling for motion (wind) and trees, birds in flight, or airplanes in flight.

All of this calls for methods. From the foregoing remarks you see that the individual must shape the method.[5] As education is of and by the life process, our first obligation in educating a child with limited expression of an act or thought is through his motor system; to free this child so far as possible from his limitation through what we call "muscle training." I fear that in our eagerness to increase the child's functional ability to do, we fail, at times, to realize just what society will demand from him as an individual. However, we try so far as possible to conduct our school room as it would be conducted for the normal child, after the physical equipment has been adapted to meet the child's handicap.

Our curriculum is truly an enterprise of guided living. The child leads us. We find that any outside force defeats our purpose. We cannot find in advance a pattern of knowledge, skill, and attitude for these children, but we use for them what Rugg[6] terms "sensitive guided living —the anticipated living." We have in mind what the normal child can do in his general development as we anticipate goals for our handicapped group. The teacher applies his teaching with a two-fold obligation as educator, striving to be alert to the child's potentialities in physical growth, as well as his potentialities in intellectual growth. For this we have muscle tests to give us an idea of how far forward we can bring the child's neuromuscular control. The boy illustrator mentioned previously had very good use of his hands, but with children of limited use of their hands, we find the same feeling for rhythm, form, and motion coming out in their finger painting.

You see many individual differences of taste in art in their choice of radio programs. Some like nothing but the best of music, others the lowest form of jazz music. Most of our little boys like mysteries or hair-raising murder stories. There are two boys in our group who like historical narratives above all. In another group of our students, who have been away from home environment since babyhood and who have limited responses to environmental influences, we see a true reason to reject the behaviorist's point on inherited traits. There are religious loyalties among them which depend wholly on their own discovery, since they have had no opportunity for church life. The same sort of thing is expressed in their choice of sports and programs on the radio. The fact is outstanding regardless of their functional experience physically. Some are definitely more verbally minded while others are more mechanically minded, but this observation, nevertheless, has primary importance.

All of this leads to habits. Our power of creation is of no use unless we have accompanying habits to focus attention on some medium giving us some form of art appreciation, like the boy who draws covers for our magazine. He does it through habit. The girl who learns to read through insight falls into a system of using her faculties of sight, attention, and interest which may be termed habit. while the selected radio programs become habitual.

No one writing in this field could do so without referring to William James.[7] He is the father, so to speak, of a living, workable, practical, satisfying psychology for us all. He says: "The great thing in education is to make our nervous system our ally instead of our enemy." This is brought in with our first aims with these children, in substituting direct motion for extraneous ones. Upon these we can build a usable educational system. These habits, according to James, might become automatic and habitual as early as possible. The quicker these new direct motions become automatic, the sooner the individual becomes free not only to manage himself, but free to manage his environment, however limited it may be. With a good base of automatic motor habits, the child can experiment beyond that base, to the extent that he has the ability to make adjustments.

In field psychology our theory is based largely on a change in the cognitive structure. This is brought about by forces, one resulting in the

field itself, and the other from certain needs or motivations. Lewin[8] says that the first type of structural forces leading to change in cognitive structure is very similar to, if not identical with, those forces which govern the perceptual field. In addition to the forces resulting from the cognitive structure, learning is influenced by the individual's values, hopes and needs. These forces can play a large part in a child with innate gifts for the arts, science and literature without the motor system to give expression in ordinary manner to the skills, even though there may be appreciation expressed in limited use of the arts.

The psychological forces can lead either to a change of the individual's organization or some form of overt expression. Creating a desired goal is the important thing in giving the motor-limited individual skills he has not known. According to the field theory of learning, it is a change in motivation. Learning as related to change in motivation deals either with a change in needs or a change in the means of their satisfaction. To these belong not only the breaking down of unsatisfactory means of expression but normal responses.

We modify the Binet mental tests, taking away the time element and the tests depending upon motor response, to judge the child's speed of learning. With these methods of determination of the child's facilities for growth, we build up our own curriculum on the progressive method of teaching. In fact, there is not a subject touched for which the child does not show some readiness before it is taught, or can be taught. These children, for example, will manifest interest in the life about them dealing with birds, animals, trees, and the like. We try to build up class room activities around these manifested interests but at the same time bring in the formal instruction which our public school system requires. This must be done, as the children are with us chiefly as patients, and are either tutored by a visiting teacher or in a class room of a public school when not with us for educational guidance and "muscle training."

The reading lessons all cover some applied knowledge which touches their everyday life. Spelling lessons are not given as an end in themselves; the words are taken from the children's reading. After these words are mastered by sight, the children are taught the spelling of the word, along with the phonetics, stressing the mechanics of the speech mechanism. Everything which has a design for living or growth for this type of child must be fitted into his curriculum in such a way that he can experience what he learns.

Therefore, the purpose of education for the child with a motor difficulty is to learn by doing, in spite of inadequate expression. The nature of education is to develop scientific systems of learning. The naturalistic system develops experience from within the individual, and the human organism is continuously making adjustments with the environment. The tools for adjustments are handed down, through both culture and individual endowment, making adjustments very complex for the normal, or average, human being, and much more so for the child who understands but cannot express himself.

So the child's desire for learning comes from within and from adjustments through trial-and-error responses to environment or culture. We try, as teachers, to help the child create desires and to meet the demands of culture by modifying the environment for the child with a motor disability—satisfaction without using outside force. The desire to learn must come from within. The response to the outside stimulus should make the next trial more satisfactory. "When the organism acts on the basis of past behavior, you have learning."[9] The things which make us more human are the things we learn from culture. "Man is a culture-producing animal as is no other animal. Man becomes man because of culture and the kind of man depends on the kind of culture."[9] Language is the one thing which distinguishes man from animals.

I have tried to show how automatic education, or outside force, brings about a blockage of any means of expression in this type of child. If you want to convert a teacher to the organic approaches to education, just let her have a group of "spastic" children with a lack of motor development for educational guidances, and no doubt she will be converted to this approach for foundation methods in an educational plan. The program is based on selecting from the patterns of culture experiences which are given to meet the responses of the type of individual we as teachers are to guide.

Our curriculum is the total program of activities which constitute our particular or peculiar educational training and undertaking. It covers all phases of school and school life. Education can be regarded in many different ways. That is, education involves the attaining of ends; but with us, we think of an educational process which leads to development of the child from a personal standpoint, both physical and mental, in this special way. It is a process of inducting the motor-handicapped child into the particular society in which he can function. Thus, we are

faced with the problem of what kind of society we want for our children, with education changing and transmitting the great cultural pattern, though limited by the child's physical ability to respond to ordinary environment. We must see that the individual becomes adaptable.

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In building our academic structure of standards we should think in terms of stresses and strains rather than merely visualize more or less decorative bric-a-brac. Standards evolved by joint action of those best informed are essential for the development of students, for the protection of teachers with an excess of initiative, and for the advance of education and science in civilization. Standards set by those with high ideals are needed in every domain where knowledge is used in practical human affairs.

It seems to me that it is quite clear that the basis of university and professional training should be one of maintaining standards. The great difficulty is to define these standards and not to consider standards, quality, and progress as synonymous terms. Choices in every field of education are difficult, and choices made by the teacher of the material in the subject in which he is interested for the instruction of students become of paramount importance. When these choices must be made upon an artificial basis because of some requirement which the student must eventually meet, we have interfered materially with the individual initiative and possible inspiration of the teacher concerned. It is particularly because of this that required set standards demanding absolute fact knowledge or knowledge of technique should be kept down to the absolute minimum. There is a central core of required fact knowledge in practically every field. There will be some difference of opinion among instructors as to just how this central core should be made up, but there would be a consensus on the part of a majority of the instructors as to the major portion of the central core. All bodies, all faculty groups setting up requirements, should from the standpoint of fact knowledge aim to get at this central core and present it and it alone on a required basis.

. . . .

Aside from fact knowledge, training in methods of approach to all sorts of questions and problems is essential. This is not so difficult in the laboratory sciences. The lack of anything like the laboratory opportunity in many fields of education has been responsible for much pedantry and nonsensical instruction. The proper use of the library, the stimulation on the part of the student to do his work by himself from the library or in other ways, would add much to our general facilities in this direction. We should always emphasize principles and facts for the beginner, rather than technique. The case method in the field of law, medicine, business administration, and elsewhere has been of great advantage because it requires much less talking by the professor and more independent work on the part of the student, with an increase in the number of written papers.—*From "The March of Medicine," by Ray Lyman Wilbur, M.D.*

Functional Reeducation of Transplanted Tendons

Elizabeth Zausmer, R.P.T.T.

During World War I the interest in the transplantation of tendons was greatly stimulated. Surgery became the most effective means of correcting the after-effects of residual paralyses from traumatic conditions.

Since then the procedure of transplanting a strong muscle to take over the function of an absent or weak muscle has been widely used to correct deformities originating from poliomyelitis. The results thus obtained have been so encouraging that this method to restore the function of otherwise useless or deformed extremities probably will be the treatment of choice in various post-traumatic conditions in the future.

It, therefore, will be of interest to formulate the basic principles that apply to the correct after-treatment of such tendon transplantations, as the outcome and functional postoperative result depend, to a great extent, on the careful and expert instruction in the proper use of the transplanted muscle.

As this paper is concerned only with the functional and locomotive problems of tendon transplantations, it will not deal with the general aspects of immobilization and other physical therapy agents, such as heat, massage, and hydrotherapy, which, however, are helpful adjuncts and should not be neglected.

The main difference in the training of a transplanted muscle as compared with either the reeducation of a traumatically denervated muscle, or with muscle reeducation in poliomyelitis, lies in the fact that the transplanted muscle has to learn how to perform a new function while in the other cases it has only to regain its former coordination and function.

Muscle innervation: Little is to be found in literature about the mechanism of innervation of a transplanted muscle. Foerster is the outstanding exponent of the theory of isolated cortical centers controling and regulating certain motor functions. He states that ". . . . the effect of galvanic stimulation (of the motor cortex) may be limited to a single muscle or even part of a single muscle. It is thus clear that the precentral gyrus contains separate innervation not only for single muscle groups but also for single muscles."[1] This concept is opposed by Goldstein[2] who claims that we never innervate single muscles or even muscle groups but that an isolated movement is only part of a total reaction of the total organism. "Whenever we intend a certain movement we do not innervate *individual* muscles or muscle groups, but a change in the present state of innervation of *all* the body muscles takes place. Thus, a *pattern* of innervation results, in which one definite contraction, namely the one which is intended, stands in the foreground . . . ."

The different conceptions of muscle innervation might be understood by approaching the problem in a different way. One theory is aimed at explaining the mechanism of a single muscle contraction. The other theory has the complex voluntary movement as its subject. Experimental investigations[4] of action potentials confirm that "even in a very simple sort of response as through a voluntary movement there is a widespread 'structural' pattern of action. The true unit of activity must be, not the flexing or extending of a particular muscle or limb, but an adjustmental design in which many regions of the organism participate."

According to Goldstein, the correct innervation of a transplanted muscle never can be obtained by proper reeducation of nervous pathways but is present right from the beginning. Practical experience, however, hardly confirms this idea. The regaining of a new function does not generally occur spontaneously, or at least is greatly enhanced by training.

It is beyond the scope of this paper to debate the two still-controversial theories. However, in practice, it will have to be acknowledged that the concept of an "innervation pattern", as outlined by Goldstein, is in full accord with the common experience that, normally, *intention movements* are performed and not

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mere muscle contractions and that, therefore, reeducation has to rely on the principle of function rather than on that of mechanism. This does not exclude the fact that under pathological conditions temporary refraining from this principle is required and that the motion complex has to be broken up into its components. At the earliest stage, training of a single muscle is necessary in order to adapt it to its new function and ultimately to incorporate its action into the integral movement. This principle of therapeutic procedure stands the more to reason as it agrees with the application of the general physical law that the stronger organ always supersedes or even takes over the functions of a weaker one.

Prevention of wrong innervation habits: In order to accomplish a good functional end result, the emphasis in the exercise therapy after muscle transplantations necessarily must be put on obtaining the desired movement rather than a good muscle contraction as such. The method of choice, therefore, will be the active movement and this should be attempted in as early a postoperative stage as is indicated surgically. While "muscle setting" (alternate contraction and relaxation) of a muscle is a valuable exercise for the toning up and strengthening of weakened or atrophied muscles after fractures[5], it always should be combined with an active movement in order to obtain a correct functional result and to prevent wrong innervation habits. Furthermore, the mere contraction and relaxation of a muscle without producing an active motion favors the simultaneous contraction and innervation of protagonists and antagonists, instead of the alternate rhythmic function of opposing muscle groups. Therefore, in the early postoperative stages, muscle strength should not be considered of primary importance; correct and proper action of the transplanted muscle is the first consideration in view of the fact that a stronger contracting muscle is not necessarily a functionally better working muscle.

In the early postoperative stage a combination of passive and guided active exercise usually will be indicated. The patient, at this point, must be protected from performing movements which might cause harmful stretching of the transplanted muscle. A full range of active movement will not be possible at first, but it is possible to have him carry out a limited part of this movement. From then. the completion of the movement to its permissible range should be carried out passively, the patient being instructed to continue to contract the muscle and to follow mentally the action in order to "condition" the muscle for its future function.[6]

It will be remembered that a normal as well as a weakened muscle, when stretched beyond its natural length, is capable of developing a greater tension and stronger action than when unstretched.[7] Exercise therapy often makes use of these physical properties of muscles by placing the part to be exercised in a starting position where point of insertion and point of origin are at a maximal distance. This cannot be done in the treatment of a transplanted muscle because of the danger of stretching it.[6] While full range of movement will be the ultimate goal, it necessarily will have to be limited at first and accomodated to the individual need. The stretching of a transplanted muscle in the early postoperative stage has to be avoided carefully. If it is continued for a longer period, the active muscle function might be seriously impaired in a later stage.

Only after the correct functional use of the new transplant without any additional or substitutional aids has been obtained may the effort be put on the strengthening of muscle power itself. Though the isotonic contraction (the contraction of a muscle while shortening) is the preferable — because functionally best — method in exercising, it must be remembered that a muscle displays its greatest strength when prevented by an external force from being shortened.[8] Resistive exercises, therefore, will be the method of choice where muscle *strength* is desired. A good combination of isotonic and resistive exercise can be obtained by instructing the patient to perform the movement actively and then to hold the position against outside resistance, e.g., to flex the knee actively and then to keep it in a flexed position while resistance is applied against the lower leg. Quite frequently it will be found that a weak muscle, unable to perform the movement actively, will be able to "hold" the position. However, the resistance should never be carried to the point where the patient is unable to overcome it without the use of additional muscles, aiding or even substituting the desired individual muscle action. Beever[9], Duchenne[10], and others have demonstrated that when there is too much resistance other accessory muscles beyond those usually involved in that special movement invariably will come into play.

Exercises must be done slowly. The correct activation and innervation to contract a transplanted muscle will necessitate a longer prepara-

tion and execution time than it will in a muscle accustomed to its former function. Exercises, therefore, should be done more slowly and with longer rest periods between them than in any other type of muscle reeducation. Franz[11] states that "complete nervous adjustments are made not only at the time a special exercise is taken, but also in the period of rest which follows one exercise and which precedes the next exercise. It is much better to give short periods of training with relatively long rest periods than to keep a patient continuously at the reeducation training as is so frequently done." Only in the later stages should the matter of speed of performance enter the exercise program, as it eventually may be required for the fulfillment of normal function.

Treatment program: The general outline of progression in a planned program for treatment of transplanted muscles is, therefore:

(a) Basically correct working capacity of the transplanted muscle, without substitution and wrong habits.
(b) Increase in range of movement, passively and actively.
(c) Increase in strength and power.
(d) Development of speed of desired movement.
(e) Full functional adaptation into integral movements.

Transplant of peroneus longus for dorsiflexion: A few practical examples of functional reeducation after tendon transplantations may help to bear out the principles outlined above. Only transplantations of the lower extremities are discussed here because they are used more frequently in the surgical treatment of the after-effects of poliomyelitis and because the functional problems are not as complex as in cases with involvement of the upper extremities. But, of course, the same principles apply to the functional treatment of any muscle transplantation.

One of the most frequent operations after loss of the tibialis anterior muscle is the transplantation of the peroneus longus muscle to the dorsum of the foot to correct foot drop and associated valgus deformity. The desired result after this transplantation is dorsiflexion and slight supination of the foot. After the cast has been bivalved, the foot should be taken carefully out of the cast, while being supported in a right angle position. During the whole treatment care has to be taken not to allow the muscle to be stretched by letting the foot drop into plantar flexion. In cases where a transplanted muscle is supposed to act in an entirely new function, e.g., the peroneus longus to work in dorsiflexion and inversion instead of plantar flexion and eversion, it often will be necessary—during the first few treatments—to ask the patient to carry out the former function in order to innervate the muscle[12]. As the muscle (through its changed anatomical position and therefore different pull) will perform the new function, the patient must be told to follow consciously the new movement and to associate it with the former innervation; that is, to contract the peroneus longus when attempting dorsiflexion. Often it will be found, however, that while the foot is actually dorsiflexing, it will swing into its former position—namely, into eversion. This is to be explained by the fact that the patient has not yet learned to innervate the transplanted peroneus longus separately. He is using the extensor digitorum as additional dorsiflexor and the peroneus brevis, which was left in its former place, for pronation and eversion, thus outweighing the weaker functioning transplanted muscle. Greatest emphasis, therefore, must be laid during the instruction period on the proper use of the transplanted muscle without any substitution or aid of other stronger muscles as mentioned above. Though other synergistically working muscles, such as the extensor digitorum longus, might be of help eventually to accomplish a stronger effect in dorsiflexion, they should be used only as accessory muscles after the patient has mastered the control of the transplanted muscle and after it has been made sure that he will use it permanently to its full possibility. If substitution of stronger muscles is allowed in the earlier stages, the transplanted muscle will never gain full strength, since a stronger structure takes over the function of a weaker one. In this connection it might be interesting to mention that a transplanted muscle as a rule will gain better strength and will be used more advantageously if there are no other muscles of sufficient strength available to assist in the execution of the desired movement. The transplanted peroneus longus will gain more strength, per se, if the extensor digitorum power is absent. This, of course, does not contradict the fact that the combined power of the transplanted peroneus longus plus a functioning extensor digitorum furnishes a better end-result and produces better function in dorsiflexion.

As mentioned before, the stretching of a

transplanted muscle must be carefully avoided. Dorsiflexion from a starting neutral position (without any initial plantar-flexion), therefore, will be indicated in the early stages of treatment. But while the muscle still might not have acquired the proper strength to complete the full range of dorsiflexion, this motion may well be performed passively to completion as explained previously. As soon as the tendon is sufficiently attached and strong enough to allow a slight amount of stretching, a more extensive range of movement should be attempted. The foot then can be actively plantarflexed to a few degrees, which gradually must be increased until a normal range of movement in both directions is obtained. Overcorrection of a deformity, which sometimes is encountered after tendon transplantations, often can be avoided by proper and continuous use of the antagonistic muscle group. While in our case extensive plantar flexion might not be attempted for a long period of time after operation, the plantarflexors of the foot, nevertheless, can be exercised continuously and extensively by having the patient push the foot down against graded resistance from a fully dorsiflexed position to the neutral position. Thus, an atrophy of the otherwise unused muscle group can be prevented. Right from the early stages of treatment, a smooth, coordinated, alternate pull between protagonists and antagonists should be attempted, one muscle group relaxing while the other is contracting. Thus wrong innervation patterns will be avoided in the future use of the transplanted muscle. Increase in strength and actual muscle power through resistive exercises —as well as increase in speed of execution— should be attempted only in the later stages of treatment.

In the early stages of treatment any position comfortable for the patient (back-lying or others) will be acceptable as long as correct function of the transplanted muscle can be obtained. But it must be remembered that the transplanted muscle should be educated as soon as possible to work in the position required for its ultimate functional use. The peroneus longus transplant discussed here might furnish a sufficient contraction and even active dorsiflexion with the patient sitting on a table, his foot supported, but it might not function in dorsiflexing the foot while walking. "Functional" exercises, therefore, should be started as soon as possible. The patient may sit on a table and go through the movement of extending the knee and dorsiflexing the foot, placing it on a chair, thus imitating the movement of taking a step. Later, as soon as he is allowed to stand, he should repeatedly go through every phase of taking a step and properly placing the foot on the floor using the transplant, before he should be allowed actually to carry out a step. Only after it has been ascertained that the transplant is functioning in this position should a series of steps be allowed, and then only under careful visual observation or even additional palpation to make sure that the muscle is working in walking.

Transplant of hamstring muscles for knee extension: This principle of the early functional use of transplanted muscles is still more important after a transplantation of part of the hamstring muscles into the patella to obtain exension of the knee. This operation, though most successful in stabilizing the knee, often fails to result in active knee extension. The main difficulty seems to be the fact that flexor muscles rarely work too well as extensors and that the patient has more difficulty in correctly coordinating this movement[13]. The early correct innervation of this type of transplantation, therefore, seems to be of even more importance than in any other type of operation. The treatment should be planned along the following outline: early active guided full knee extension from a slight flexion position; then active guided full knee extension from an increased flexion position. If the patient in the first stages should not be able to complete the movement of knee extension actively, he should be assisted by performing the movement passively. The preferred starting position for exercising a knee transplant will be with the patient lying on his side, the leg to be treated supported on a board, thus eliminating gravity. Often it will be found that it will be easier for the patient to accomplish the movement of knee extension while simultaneously extending the hip, the hamstrings thus performing their former action of hip extension. Though this movement might be an accessory help in the very first treatment sessions in order to initiate a contraction, it should be discouraged as a rule, as it will be difficult later for the patient to divorce the two movements. Knee extension should preferably be carried out with the hip in a partially flexed position as it is in normal walking.

Knee flexion exercises, first in limited range, using the remaining hamstrings and other assisting muscles, should not be forgotten, applying the principle of not neglecting the antagon-

ists, as previously outlined for the transplanted peroneus longus. It will be particularly important to make sure that the patient is not using the transplanted muscles in both flexor and extensor functions as it is quite often observed. The most frequently found form of incoordination is the simultaneous innervation of the transplanted muscles and the remaining flexors in attempted knee extension. This defeats the purpose and results in the simultaneous function of antagonistic muscle groups, preventing a smooth, coordinate and alternate movement.

Again, as soon as possible, the functional use should be initiated by having the patient go through the motion of walking while still lying on his back. All phases of the movement—namely, plantarflexion of the foot, hip flexion followed by knee extension (using the transplant), and concluding hip extension and dorsiflexion of the foot—should be firmly established in the mind of the patient before he is allowed actually to carry them out in a standing position. The slow-motion-like, analyzing type of movement should be exercised for a long period of time to insure proper knee extension, correct foot placement and shifting of weight to the supporting leg. This avoids hyperextension of the knee, only too often the undesired effect of hamstring transplantations.

SUMMARY AND CONCLUSION

(1) Functional reeducation is the basic principle in developing function of transplanted muscles and tendons. It is in accordance with the physiology of motor innervation.

(2) Two prominent theories of the mechanism of innervation—related to the subject of functional reeducation — are quoted.

(3) The importance of obtaining correct functional movements, instead of mere muscle contractions, is stressed. Active motion rather than "muscle setting" must be attempted.

(4) Isotonic and isometric contractions, passive, active guided, and resistive exercises and related subjects are discussed in their relation to functional reeducation.

(5) The graded stages in a plan of treatment are defined. This program progresses from the training of the individual muscles to the fully integrated functions.

(6) Practical examples of muscle transplantations and their functional reeducation are demonstrated.

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Physical Therapy in the Treatment of Arthritis

Shelby Gamble, M.D.

Physical agents have great therapeutic value for the various forms of arthritis and remain the most potent single weapon at hand, since, on the whole, physical methods have more influence upon arthritis than have the various medical means, unless the arthritis is of a specific nature. Physical therapy, however, should never be employed to the exclusion of other therapeutic procedures and can be employed to its greatest advantage only when included in such a well planned regimen of treatment.

Although institutionalizing an arthritic for treatment may be the ideal management, depending upon the degree of involvement, it may be impractical because of finances, home conditions, and so forth. In the discharged patient, as well as the patient who is never institutionalized, physical therapy and other forms of treatment must be continued at home or in an ambulatory regimen in the outpatient department lest benefits gained during hospitalization be lost.

It is my intent to discuss practical physical therapy measures as used at the Cleveland Clinic on the arthritic service. Heat in its various forms, massage, and exercise are the basic agents in all treatments. For the patient at complete bedrest, either because of his general condition or because rest to the joints is required in an overweight osteoarthritic, infra-red baking or diathermy for 30 to 35 minutes once or twice daily is administered depending upon the acuteness of the joint condition. This is followed by massage, the joint being avoided at first and the muscles and ligaments being massaged above and below the joint. As the acute condition subsides, massage directly over the joint is warranted. A heat cradle with two to four 60-watt light bulbs over the involved knees and ankles for one-half to one hour three times daily not only gives continued infra-red baking but also keeps the weight of the covers off the painful joints. For this purpose a foot board is necessary when a cradle is not used.

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As the patient becomes ambulatory, he receives additional treatment once or twice daily in the physical therapy department. Later in the treatment program some patients receive all their physical therapy treatments in the department, where in addition to the infra-red baking, diathermy, and massage, hand and foot paraffin baths or hand and foot whirlpool baths may be ordered.

Depending on the individual case we have a slight preference for the paraffin bath, primarily because afterward the skin is in good condition for massage without additional lubricants. When the regimen is prolonged, the skin does not tend to become as dry or raw and edematous with the paraffin baths as with the whirlpool baths. However, in any condition with a wound there is no substitute for the whirlpool bath, and the gentle massaging effect does much, especially if there is little time or a shortage of technicians to carry out manual massage afterward.

The Hubbard tank may be used much in the same way as the whirlpool bath, the principles of treatment being the same. When a number of joints are involved, only one treatment rather than a number of individual joint treatments is necessary. In addition various exercises can be carried out under water with ease, owing to the elimination of gravity.

Sunlight and artificial ultraviolet irradiation are valuable as general tonic measures, even though they have no proved scientific effect. With this addition to the regimen, patients seem to feel better generally and to eat and sleep better than those who do not receive it. Overexposure must be avoided, for toxic reactions can be very detrimental to the patient.

Common ion transfer, using either histamine or mecholyl as vasodilating drugs, is said to be of value applied locally to a joint which does not respond to ordinary measures. Our experience with this form of treatment is limited, because we prefer to use the more common methods. However, common ion transfer in cases with associated vasomotor instability, especially of the extremities, has produced good results when used over long periods of time. Many

persons are sensitive to these drugs, and systemic reactions are common without careful observation.

Fever therapy in arthritis is an important agent. Intravenous typhoid vaccine is very satisfactory for the production of fever. Fever therapy by means of a cabinet is very time consuming and highly specialized. Adequately trained personnel is of utmost importance, and during the present shortage of technicians we have dispensed with this form of treatment.

The importance of exercise is generally disregarded. As our service hospitals have dramatically shown, it takes only a few simple movements a day to keep a joint from becoming ankylosed when immobilized. When the condition of the joint is acute, very little motion of course is possible. Some men state that, regardless of the acuteness of the condition, each joint should be put through as full a range of motion as possible once or twice a day without undue distress to the patient. From a practical and conservative point of view, a few days' rest should do no harm. However, there is no doubt that early movement of involved joints is imperative if restriction of motion or ankylosis is to be prevented.

Disregarding arguments for and against passive and active exercise, each joint in the beginning, after heat and massage have been applied, should be put through as full a range of motion as possible without undue distress to the patient. If the patient cannot do this for himself, passive motion is indicated to maintain joint movement, because muscle weakness or substitution is not a factor as it is in certain other conditions. It is important that the range of motion be maximum; slight distress is permitted, but severe pain only increases muscle spasm about the joint and defeats the purpose of the exercises. As the joint subsides and clinical judgment warrants, assisted exercise and full active exercise are given. Finally after the pain has completely subsided, active stretching exercises, either manually or by means of apparatus, are ordered. Most patients believe that they must keep on their feet and keep going, if stiffness in the joints is to be prevented. By doing so they can do considerable harm. Bedrest with an intelligent and comprehensive program of heat, massage, and exercise is the measure really needed. Insufficient attention is paid to the posture and breathing exercises of all patients. In the arthritic patient these are of tremendous importance, because it is not to our credit to treat one or two joints and pay no attention to the over-all picture.

From the point of view of treatment various occupational therapy measures are of great value in obtaining specific exercise in the convalescence of an arthritic, both in the hospital and in the home. Of additional importance is the psychologic aspect of keeping a patient interested and busy during a long period of bedrest.

Although this article is of a general nature, a word should be said about two common conditions in which physical therapy plays a very important role; namely, osteoarthritis of the cervical spine and periarthritis of the shoulder.

In osteoarthritis of the cervical spine, especially with secondary radiculitis, heat and massage and manual stretching or stretching by means of a Sayre head sling are of prime importance. In obstinate cases that cannot be handled on an ambulatory regimen, hospitalization and cervical traction by means of a head halter are necessary in addition to continuation of physical therapy measures. Likewise, periarthritis of the shoulder in the subacute or chronic stage usually responds well to heat, massage, and specific shoulder exercises. Movements of abduction and internal and external rotation are most restricted. The use of apparatus, such as pulleys on the bed or wall, is of value in obtaining the stretching movements desired. In cases that do not respond to these measures, hospitalization and traction with or without manipulation under anesthesia are necessary.

Whether the patient is discharged or is on an ambulatory regimen from the outset, treatment in the outpatient department two or three times a week is not sufficient. In addition he should carry on a well outlined and comprehensive program at home each day that he does not report to the department for treatment. Usually our patients are treated three times a week at the start and the number of treatments is gradually decreased as the patient's condition warrants.

In multiple joint involvement the ordinary bathtub is the simplest and most convenient means of obtaining general heating, relaxation of muscle spasm, and relief of pain at home. The temperature of the bath should be approximately 100 F. and should last from fifteen to twenty minutes if no undue weakness or fatigue results. Afterward the patient should be kept warm and at rest for approximately one hour. As a general rule, only three such baths should be allowed a week. In a very old or debilitated patient such baths are probably contraindicated.

Hand paraffin baths in a large double boiler have been found ideal for the hands and wrists of outpatients. Satisfactory results have been

obtained with a foot paraffin bath of a similar nature. This procedure is very inexpensive and, as mentioned previously, leaves the skin soft and smooth. Because the average patient is not too concerned about specific technics, water soaks often leave the skin macerated and chapped.

Heating pads, infra-red lamps, and homemade cradles provide heat for other body joints. Except where the joints are easily accessible, the patient intelligent and cooperative, and help available in the home that can be instructed in massage, massage is dispensed with, and a suitable exercise program is relied upon. As previously stated, a very simple program of occupational therapy can be of great benefit in gaining the specific motions desired.

It is of utmost importance that an arthritic patient be followed closely. In order to accomplish the most good as well as to prevent monotony from repetition over a long period of time, an arthritic patient should be observed frequently and the program adjusted as the patient's condition changes. A great deal of harm can be done with certain procedures over a period of time when supervision is irregular and infrequent and interest lacking.

Much can be done for the arthritic patient to the surprise of the patient and his family and often of the physician. By proper use of various agents of physical medicine along with other measures available in medicine and surgery, we have much in our therapeutic armamentarium. These plus a cooperative patient, elimination of economic need similar to that for the tuberculous patient, and prolonged treatment should do much in satisfactorily solving our arthritic problems and making such patients as independent as possible.

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Reprints Available

Reprints and pamphlets as listed below may be obtained from the following organizations:

American Physiotherapy Association, 1790 Broadway, New York 19, N. Y.:

"Physical Therapy — A Growing Profession." (Free)

"Physical Therapy: A Service and a Career." (Free)

"Physical Therapy in a Plastic Surgery Unit," by Honor C. Wilson. (Free)

"Proceedings of Poliomyelitis Round Table from 1944 Conference." (Price, 25c)

Joint Orthopedic Nursing Advisory Service, 1790 Broadway, New York 19, N. Y.:

"Improvised Equipment for the Physically Handicapped (1944)," by Margaret S. Arey. (Free)

Institute for the Crippled and Disabled, 400 First Avenue, New York 10, N. Y.:

"The Physical Demands of Daily Life." (Price, 10c)

Physical therapists are needed for poliomyelitis epidemic areas this summer. Write now to the National Office, 1790 Broadway, New York 19, N. Y., if you can serve.

Diathermy and Radio Interference

The Federal Communications Commission has just completed a most extensive survey of the communications services of the radio spectrum. In a news release May 17, 1945 the commission announced its final frequency allocations to the nongovernmental radio services in the portion of the spectrum between 25 and 30,000 megacycles with the exception of the region left unassigned for frequency modulation pending the outcome of certain tests now under way. The frequency allocations for scientific, industrial and medical devices including diathermy apparatus are as follows:

Wavelength (Meters)	Dominant Frequency (Megacycles)	Frequency Band (Megacycles)	Band width in per cent, Approximately
21.95	13.660*	13.653 13.667	±0.05
10.98	27.320	27.185 27.455	±0.5
7.32	40.980	40.960 41.000	±0.05

* The 13.660 megacycle band was assigned previously.

In its proposed report on Jan. 15, 1945 the commission recommended a 30 kilocycle channel (0.05 per cent) for the 27 megacycle region, but in the final report on the recommendation of the manufacturers of diathermy apparatus the commission assigned a 270 kilocycle band, which corresponds to 0.5 per cent channel width approximately. The other allocations for scientific, industrial and medical devices were left unchanged. The commission requested that all equipment be adjusted and maintained as closely as possible to the dominant or middle frequency in each band.

The high frequency energy generated by diathermy equipment has been known to interfere with radio communications. For this reason the commission was obliged to allocate frequencies for medical and surgical applications and for industrial heating. The high frequency electrical energy generated by short wave and long wave diathermy is much the same electrically as that generated by radio broadcasting apparatus. Although the diathermic energy is supposed to be absorbed by the tissues, unfortunately some of it is not and is radiated into space. This energy, if on the same wavelength as established communications, may cause interference.

It is generally agreed among the manufacturers of diathermy machines that band widths of 0.5 and 0.05 per cent will increase the cost of equipment and the service expense. Apparatus made to operate on the narrower channel (0.05 per cent) will cost much more, according to the estimates of the manufacturers.

The Council has given most careful consideration to the entire problem of radio interference by diathermy equipment. In view of the general interest which has been displayed, the Council desires to discuss the matter.

At its recent annual meeting (Feb. 12, 1945) the Council on Physical Medicine of the American Medical Association voted that in the interest of public relations it desires to support the stand of the Federal Communications Commission and that it does not care to be in opposition to the federal agency which is responsible for this important decision.

Furthermore, the Council voted that the suggestion by some of the manufacturers to confine diathermy to one single frequency was unwise. The Council believed that three frequency channels might well be allocated for diathermy, the width of these channels to be decided by the commission.

The Council's decision was based on consideration of the relative importance of serious communication requirements and those of diathermy and the fact that the cost of meeting the situation on the part of the profession is an insignificant part of the whole cost of medical care.

The following facts entered into the Council's deliberations:

1. That diathermy is a useful therapeutic procedure for applying heat to the tissues of the body.

2. That diathermy is not the only method of applying heat for therapeutic purposes, though it is the most effective method known for administration of deep heat.

3. That medical diathermy has interfered with radio communications.

4. That successful operation of medical diathermy does not necessitate radiating high frequency electrical energy into space. In other words, the radio energy dispersed is a by-product and the diathermy equipment would be much

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more efficient electrically if this energy did not escape but was absorbed by the tissue.

5. That controlled diathermy apparatus designed to operate on a narrower tolerance will cost more per unit than previous equipment.

6. That the therapeutic efficacy of the frequency controlled diathermy apparatus is the same as that of prewar uncontrolled apparatus.

7. That screening the diathermy equipment is one solution of the problem though not practical in many instances. Screening is expensive if the decorations (papering and plastering) of the treatment room are taken into consideration and, furthermore, the mobility of the equipment is limited.

8. That the problem is one of sound medical services and questions pertaining to public relations.

The Council studied two points of view which were raised by the specialists in this field:

1. That there are a number of physicians specializing in physical medicine who are responsible for the operation of physical therapeutic departments in hospitals and in private offices and that these physicians are mindful of budgets and expense of equipment. These specialists, and likewise the Council, are not pleased with the prospects of paying higher prices for diathermy apparatus which are no better therapeutically than uncontrolled devices.

2. That a larger group of physicians do not employ diathermy to any great extent, if at all, in their practice and are not greatly interested.

For several years the medical profession has been accused by various radio interests of interfering with radio communication and of usurping too much of the radio spectrum. This is not good public relations. Those radio interests are of considerable importance, as, for example, the police, Coast Guard, Army, Navy, television, frequency modulation, and other services. In spite of the fact that some physicians might be called on in the future to pay a higher price per unit for diathermy apparatus, the Council chose the approach which in its opinion will benefit the greater number of the profession, e. g. maintaining cordial public relations, and decided to accede to the recommendations of the Federal Communications Commission.

The Council has filed a request with the Federal Communications Commission to allow at least five years for physicians to liquidate their investment in existing diathermy apparatus before being asked to screen them, dispose of them, change them or purchase apparatus which will be frequency controlled.

Some diathermic equipment, especially in hospitals and office buildings of steel construction, may be screened sufficiently so that it may cause little or no interference with radio communications. In these few instances the commission may not insist on any change. The extent of interference will be determined by measuring devices manned and operated by the Federal Communications Commission. If the commission accedes to the Council's request to provide a period of several years for the physicians to make the change, it is unreasonable to think that a physician practicing physical medicine and using diathermy extensively will find his hospital department broken up or his practice ruined.

Surgical diathermy is not regarded as a source of serious interference to communications, and hence the Federal Communications Commission does not contemplate the regulation of this service.

The Council believes that the commission is serving the best interests of the public at large and of the majority of the medical profession in the United States. These public relations are not confined to this nation alone but to Canada, Mexico and other countries. Hence another agency, namely the International Radio Advisory Committee, a subcommittee of the Department of State, is authorized to make necessary preparations for treaties with other nations of the world. The afore-mentioned allocations the commission states are subject to change necessitated by international agreements.

Advances in technology often create sociological problems which have to be settled by compromises. This is another manifestation of sacrifices by a smaller group made necessary or advisable in the interest of tranquil and cordial relations for the benefit of the public at large.

The Council on Physical Medicine believes that the Federal Communications Commission has studied the problem very carefully and that the commission is fully informed about the questions pertaining to medical service and public relations. The Council hopes that the decisions reached by the commission will be satisfactory to all concerned.

Schools Approved for Training Physical Therapists

By Council on Medical Education and Hospitals of the American Medical Association

Name and Location of School	Medical Director	Technical Director	Entrance Requirements*	EMERGENCY COURSE				REGULAR COURSE			
				Length in Months	Classes Start	Tuition	Certificate, Degree, Diploma	Length in Months	Classes Start	Tuition	Certificate, Degree, Diploma
Children's Hospital, Los Angeles	Samuel S. Mathews	Lily H. Graham	a-b-c	6	FebAug	$200	Certificate	12	FebAug	$200	Diploma
College of Medical Evangelists, Los Angeles[1]	F. B. Moor	A. H. Carlson	c	..	.....	....	.....	12	JanJuly	$215	Cert. or Degree
University of California Hospital, San Francisco[1]	Frances Baker	Margery Wagner	a-b	..	.....	....	.....	12	MarOct	$150	Certificate
Stanford University, Stanford University, Calif.[1]	Wm. Northway	Lucille Daniels	a-b-d[2]	7	Quart.	$286	Certificate	10	Quart.	$409	Cert. or Degree
Fitzsimons General Hospital, Denver	Ora L. Huddleston	Harriet S. Lee	†	6	Quart.	None	Certificate	..	.....	.....	.....
Walter Reed General Hospital, Washington, D. C.	D. L. Rose	Evelyn MacDonald	†	6	Quart.	None	Certificate	..	.....	.....	.....
Lawson General Hospital, Atlanta, Ga.	Arthur M. Pruce	Felie W. Clark	†	6	Quart.	None	Certificate	..	.....	.....	.....
Northwestern University Medical School, Chicago	John S. Coulter	Gertrude Beard	a-b-d	..	.....	....	.....	12	JulyOct	$300	Certificate
State University of Iowa Medical School, Iowa City	W. D. Paul	Olive C. Farr	b-c	6	MarSept	None	Certificate	9	MarSept	None	Certificate
University of Kansas School of Medicine, Kansas City, Kans.	Gordon M. Martin	Ruth G. Monteith	c[3]	..	.....	....	.....	9	Varies	$25[4]	Cert. or Degree
Bouve-Boston School of Physical Education, Boston	Arthur L. Watkins	Constance K. Greene	c[3]	6	July	$250	Certificate	36	Sept	$400 yr.	Degree
Harvard Medical School, Boston	Frank R. Ober	Janet B. Merrill	a-b-c	6	Varies	$250	Certificate	9	Varies	$300	Certificate
Boston University, College of Physical Education for Women, Sargent College, Cambridge, Mass.	Louis Howard	Adelaide McGarrett	H.S.	Given in conjunction with Harvard				36	Oct	Varies	Degree
Percy Jones General Hospital, Battle Creek, Mich.	Robert F. Dow	Margaret L. Rhodes	†	6	JanJuly	None	Certificate	..	.....	.....	.....
University of Minnesota, Minneapolis[1]	Miland E. Knapp	Sara E. Kollman	a-b-c	..	.....	....	.....	12	Jan	$200	Certificate
Mayo Clinic, Rochester, Minn.[1]	Frank H. Krusen	Carl O. Moe	a-b-c	6	JanJuly	None	Certificate	12	JanJuly	None	Certificate
Barnes Hospital, St. Louis	F. H. Ewerhardt	Beatrice F. Schulz	a-b-c	..	.....	....	.....	9	Oct	$200	Certificate
St. Louis University School of Nursing, St. Louis[1]	Alexander J. Kotkis	Sr. Mary Imelda	a-b-c[3]	..	.....	....	.....	9	Sept	$250 yr.	Cert. or Degree
O'Reilly General Hospital, Springfield, Mo.	G. S. Phalen	Ethel M. Theilman	†	6	Quart.	None	Certificate	..	.....	....	.....

Name and Location of School	Medical Director	Technical Director	Entrance Requirements*	EMERGENCY COURSE				REGULAR COURSE			
				Length in Months	Classes Start	Tuition	Certificate, Degree, Diploma	Length in Months	Classes Start	Tuition	Certificate, Degree, Diploma
Columbia University, New York City	Wm. B. Snow	Josephine Rathbone	a-b-c	..	.....	....	.....	10	FebSept	$480	Certificate
Hospital for Special Surgery, New York City[1]	K. G. Hansson	Ethel Wilmer	a-b-c	..	.....	....	.....	9	Sept	$300	Diploma
New York University School of Education, New York City[1]	George G. Deaver	Paula Blackman	a-b-c	..	.....	....	.....	9	FebSept	$450	Cert. or Degree
Duke University School of Medicine, Durham, N. C.[1]	Lenox Baker	Helen Kaiser	a-b-c	..	.....	....	.....	12	Oct	$200	Certificate
Cleveland Clinic Foundation Hospital, Cleveland	W. J. Zeiter	Anna Wetterhuus	a-b-c	..	.....	....	.....	9	Sept	None	Certificate
D. T. Watson School of Physical Therapy, Leetsdale, Pa.[1]	Jessie Wright	Kathryn Kelley	a-b-c	6	Oct	$200	Diploma	12	Oct	$200	Diploma
Graduate Hospital of the University of Pennsylvania, Philadelphia, Pa.[1]	Wm. T. Johnson	Samuel Henshaw	a-b-c	..	.....	....	.....	12	JanSept	$200	Certificate
University of Texas School of Medicine, Galveston	G. W. N. Eggers	Ruby Decker	a-b-c	..	.....	....	.....	9	Jan	$100	Certificate
Brooke General Hospital, San Antonio, Tex.	Robert L. Noell	Elsie Kuraner	†	6	Quart.	None	Certificate	..	.....	.....	.....
Bushnell General Hospital, Brigham City, Utah	Harry A. Bradley	Doris Anderson	†	6	JanJuly	None	Certificate	..	.....	.....	.....
Richmond Professional Institute, Richmond, Va.	Thomas Wheeldon	Erna Cannon	a-b-d	..	.....	.....	.....	9	Sept	$200	Cert. or Degree
Ashford General Hospital, White Sulphur Springs, W. Va.	Carl Levinson	Agnes P. Snyder	†	6	FebAug	None	Certificate	..	.....	.....	.....
University of Wisconsin Medical School, Madison[1]	Elizabeth Grimm	Margaret Kohli	a-b-c	..	.....	....	.....	9	Sept	Varies	Certificate

*Courses are so arranged that any of the entrance requirements will qualify students for training. a = Graduation from accredited school of nursing; b = Graduation from accredited school of physical education; c = Two years of college with science courses; d = Three years of college with science courses; H.S. = High school graduation.

†For complete information regarding entrance to Army training schools write to Major Emma E. Vogel, Director of Physical Therapists, Office of the Surgeon General, War Department, Washington 25, D. C.

[1]Male students are admitted.

[2]High school graduates accepted for a four-year course leading to A.B. degree; students admitted quarterly and tuition is $143 per quarter.

[3]High school graduates accepted for four-year college course.

[4]Nonresidents charged additional fee.

The Physiotherapy Review

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Veterans' Administration

The American Physiotherapy Association has been making every effort to obtain professional classification for physical therapists employed in the Veterans' Administration under Civil Service.

The Association is acutely aware of the injustice done to physical therapy by placing physical therapists in a subprofessional classification. It must be made clear, however, that this ruling has come from the Civil Service Reclassification Board and not from the Veterans' Administration.

Three bills have been introduced in Congress to establish a Bureau of Medicine and Surgery in the Veterans' Administration, two by congresswoman Rogers of Massachusetts and one by Congressman Rankin of Mississippi.

The Association believes it is essential that there be a Bureau of Medicine and Surgery established in the Veterans' Administration. The quality of all medical services should be at least equal to that of the Army and Navy. The Medical Advisory Committee to the Veterans' Administration has endorsed such a bureau. We urge each member to write his or her congressman asking him to support legislation to establish a Bureau of Medicine and Surgery in the Veterans' Administration. Talk to local groups and explain the need of including all medical auxiliary services in such a bill. The physician must have at his command the best that the professions can supply—physical therapists, nurses, occupational therapists, dietitians, medical librarians and medical technologists.

This is a responsibility which we as individuals must assume. The veteran is entitled to and must receive the best that we have to offer—not later, but **now. Write your congressman.**

Annual Reports

The annual reports of the American Physiotherapy Association will be published in the September-October 1945 issue of the Review. The annual report of the Executive Committee and the House of Delegates will appear in a forthcoming membership news letter.

Nineteen chapters of the American Physiotherapy Association were represented at the House of Delegates' Session, with delegates as follows:

Chapter	*Delegate*
California	Hazel Furscott
Carolina	Mary Singleton
Connecticut	Josephine Hibben
District of Columbia	Mia Donner
Georgia	Alice Lou Plastridge
Illinois	Mary Peabody
Maryland	Grace Shaw
Massachusetts	Mildred Evans
Michigan	Anna Mulcahey
Minnesota	Lillian Hubmer
New York	Mary Cover
Ohio	Emmy Kylin
Pennsylvania	N. R. Kressley
Rhode Island	Arleen Ward
So. Minnesota	Carl O. Moe
Washington	Helen C. Anderson
Western Penna.	Carol Bankson
Western New York	Grace Smith
Wisconsin	Emma Zitzer

1945-46 Dues

American Physiotherapy Association dues were payable as of May 1, 1945. If you have not paid your dues by August 1, 1945, your name will be removed from the mailing list for the REVIEW.

If you are a chapter member, pay your dues to your chapter treasurer. If you are a member-at-large, send payment to the National Office, 1790 Broadway, New York 19, N. Y. Provisional dues are $4; active dues are $8.

Provisional Membership

At the Annual Meeting of the Executive Committee and the House of Delegates of the American Physiotherapy Association at Bear Mountain, N. Y., June 22-23, 1945, the amendment to the Constitution eliminating provisional membership was passed.

Any provisional member, except an emergency

course graduate who has not completed her apprentice training, may become an active member immediately upon payment of national active dues. This would mean that if she has already paid her provisional dues of four dollars for 1945-46, she should pay an additional four dollars to obtain active membership. If she has not yet paid her provisional dues, she may become an active member by paying eight dollars.

The provisional member may continue in provisional membership until April 30, 1946. It is the hope of the Executive Committee that this group will avail themselves of the opportunity and privilege of becoming full voting members of the Association.

New Chapters

Two new chapters of the American Physiotherapy Association have recently been organized —namely, Western Pennsylvania and Southern Minnesota.

Georgia Chapter

The Georgia Chapter of the American Physiotherapy Association held its annual meeting at Georgia Warm Springs Foundation, Warm Springs, Georgia, on April 21, 1945. Following the business meeting and election of officers, thirty-five members and guests from Atlanta, Savannah and the Georgia Warm Springs Foundation enjoyed an outdoor picnic supper. At the evening session, Alice Lou Plastridge gave a brief history of the national organization of the American Physiotherapy Association and told of its scope and aims. An illustrated lecture on "Operative Care of Poliomyelitis" was presented by Dr. C. E. Irwin, Chief Surgeon of the Georgia Warm Springs Foundation.

Pennsylvania Physiotherapy Association, Inc.

On May 3, 1945, the Pennsylvania Physiotherapy Association, Inc., and the Pennsylvania Occupational Therapy Association held a joint meeting at the U. S. Naval Hospital in Philadelphia. Approximately 250 persons attended this meeting, the program of which was as follows:

"Combat Fatigue" by Lt. Comdr. Joseph N. Hughes (illustrated with a "Talkie" film).

"Physical Therapy in the Treatment of Psychoneurosis" by S. Paul Campbell.

"Occupational Therapy at the U. S. Naval Hospital, Philadelphia" by Lt. (j.g.) Frances Helmig.

Pauline Mansfield

It is with regret that we learned of the death, on April 9, 1945, of Pauline Mansfield who was a member of the Executive Committee of the American Physiotherapy Association 1930-32. Miss Mansfield was a member of the Massachusetts Physiotherapy Association, Inc.

National Rehabilitation Week

A National Rehabilitation Week was officially announced recently by President Truman with a proclamation as follows:

"Now, Therefore, I, Harry S. Truman, President of the United States of America, do hereby declare the week beginning June 2, 1945, as National Rehabilitation Week. I urge all churches, educational institutions, health and welfare services, civic organizations, chambers of commerce, boards of trade, industry, labor, public-spirited citizens, radio, and the press throughout the United States to observe National Rehabilitation Week, to the end that handicapped men and women throughout our Nation may be located and advised of the benefits to which they may be entitled." In connection with this, we would like to suggest that you reread the article entitled "The American Plan for Rehabilitating the Civilian Disabled" by Michael J. Shortley which appeared in the July-August 1944 issue of the REVIEW.

National Rehabilitation Council

A meeting of the National Council on Rehabilitation was held in New York City on May 9 and 10, 1945.

American Congress of Physical Medicine

The annual scientific and clinical session for 1945 of the American Congress of Physical Medicine has been cancelled. This meeting was to have been held in New York City, September 5 to 8, 1945.

A color photograph of Lt. Helen Matchett, P.T., A.U.S., appeared on the cover of "This Week," Sunday, June 24, 1945.

National Foundation for Infantile Paralysis:

First Scholarship Award

Identical twin sisters, one the winner of the first scholarship in physical therapy to be awarded by the National Foundation for Infantile Paralysis under a nationwide $1,267,600 free training program and the other who has won her first lieutenant's bar as a physical therapist in the Army Air Force, were honored at a luncheon at the Hotel Waldorf Astoria, May 25, 1945. They are Miss Marjorie Katherine Ionta, physical education instructor at North Weymouth, Mass., winner of the scholarship, and First Lieutenant Margaret Ionta, now stationed at the regional air base hospital, Orlando, Fla. Lieutenant Ionta was granted leave to fly to New York to attend the awarding of the scholarship to her sister who has now started her physical therapy studies.

At the ceremonies Miss Marjorie Katherine Ionta was greeted by W. C. Bowen, executive assistant to the president of the National Foundation, Basil O'Connor, who was out of the country, and was presented with a framed copy of the letter awarding her the first scholarship, as follows:

My dear Miss Ionta:

In behalf of Mr. Basil O'Connor, President of The National Foundation for Infantile Paralysis, I want to congratulate you upon winning the first scholarship in our special physical therapy training program for 1945.

Your interest in physical therapy, coupled with your previous training in the field of physical education, qualifies you for a place in this increasingly important profession, which is an adjunct to medicine and which means so much to the care of infantile paralysis victims and others suffering from injury and disabling diseases.

It is upon you and the others who will be trained within the next two years that the health and physical strength of thousands of patients in hospitals throughout the nation depend in a large part.

Left to right: Catherine Worthingham, Jessie Stevenson, Marjorie K. Ionta, Mary McMillan and Lt. Margaret Ionta.

Our present supply of qualified physical therapists, doing valiant duty in military and civilian life today, cannot meet the demand for their services which is anticipated for the postwar years.

I wish you success in your chosen profession, good health, and a long career of humanitarian service.

Sincerely yours,

W. C. Bowen,
Executive Assistant
to the President.

Miss Catherine Worthingham, director of technical education of the National Foundation, introduced some of the other guests present at the luncheon, including the medical directors of the three approved physical therapy schools in New York City—namely, Dr. Wm. B. Snow, Columbia University; Dr. George G. Deaver, New York University, and Dr. Kristian G. Hansson, Hospital for Special Surgery. Also present were Josephine L. Rathbone, technical director of physical therapy at Columbia University; Paula Blackman, technical director of physical therapy at New York University; Jessie L. Stevenson, President, American Physiotherapy Association; Mary McMillan, first president of the American Physiotherapy Association, and A. Garman Dingwall, President of the New York Chapter of the American Physiotherapy Association.

We of the American Physiotherapy Association who were present feel very proud that the National Foundation has recognized the great need for qualified physical therapists and has made available funds for their training. The Association is very grateful to the National Foundation because this offers us the greatest opportunity we have had for developing our profession and because it will provide an adequate number of physical therapists to meet the demands of the armed forces and civilians.

International Exchange Fellowships

The National Foundation for Infantile Paralysis has established exchange fellowships with the Toronto Workmen's Compensation Clinic, where there is a well coordinated program of physical therapy and occupational therapy under the direction of Dr. Harold E. Storms. These fellowships will offer new opportunity for physical therapists and occupational therapists of Canada and the United States to study each others methods and report to their respective groups on innovations, experiments and results. This should increase the knowledge of both countries on this phase of rehabilitation.

The first international exchange fellowship was awarded to Miss Marian Williams, instructor in the Division of Physical Therapy at Stanford University, California. Mrs. Mary Clinckett, supervisor of physical therapy at the Toronto Clinic, exchanged with Miss Williams and spent a month at Stanford.

Infantile Paralysis—1945: An Appeal for Physical Therapists

Cases of infantile paralysis during the first twenty-four weeks of 1945 number 999, according to reports from United States Public Health Service, an increase of fifty-two per cent over the comparable period in 1944 when 657 cases were recorded. Twenty-eight states show increased incidence of the disease over last year.

No accurate forecast can be made at this time as to what other areas of the country will suffer outbreaks of the disease or whether the final tally of this year's epidemic will exceed last year's total of 19,270 victims, the second largest recorded epidemic in the United States. However, the abnormal increase in cases at the present time indicates a severe epidemic of infantile paralysis is already well on its way.

The intensity of the outbreak thus far has reemphasized the importance of making available adequate medical care for all victims of the disease regardless of age, race, creed or color which is one of the responsibilities of The National Foundation for Infantile Paralysis. Surveys of hospital and medical facilities for the care of infantile paralysis patients were made in cooperation with local health authorities far in advance of the epidemic as part of the National Foundation's pre-epidemic planning. Many of the gaps in medical services which these surveys disclosed have already been filled. Despite these efforts and the close cooperation of public health officials and agencies, it is reasonable to assume that not all the problems of infantile paralysis care can be met adequately as the intensity of the epidemic increases. From past experience it is known that there will be further need for the closest cooperation among all concerned in meeting the exigencies of a severe outbreak of infantile paralysis.

The experience of previous years indicates that once again a great obstacle to the adequate care of these victims will be the lack of physical therapists whose skillful services are so vitally necessary for the patients' fullest possible recovery with a minimum of after-effects.

All physical therapists who are available or can be released from duty for a month, six weeks or longer are urgently requested to notify national headquarters of The National Foundation for Infantile Paralysis, 120 Broadway, New York

5, New York. There is an immediate need for these physical therapists who can contribute real service to victims of the disease and enrich their own technical experience in the early care of infantile paralysis. Adequate salary, transportation and maintenance will be provided by The National Foundation for Infantile Paralysis.

Army Personnel Release Policy

Although substantial releases of Army Medical Department personnel will not take place before the latter part of this year, Surgeon General Norman T. Kirk has announced a policy on discharges in conformity with War Department procedures. The policy, which applies with equal effect to Army medical officers assigned to Veterans Administration and other agencies, reads in part:

"(a) All Medical Department dietitians and Medical Department physical therapists whose husbands have been released from active duty will be discharged on request when release of husband is proved.

"(b) Military necessity will govern all others. Since there is a shortage of these officers, it is not contemplated that others will be released from the service except in *a*."

Army Technical Training Conference

On May 4, 1945, the Commanding General, Army Service Forces, approved a request for a technical training conference for directors of physical therapy and physical therapists from general hospitals conducting physical therapy training courses and from selected amputation centers. The request was initiated in the office of Colonel Leonard T. Peterson, Orthopedic Consultant, Office of the Surgeon General, and concurred in by the Training Division, Office of the Surgeon General. This conference was conducted at Percy Jones Hospital Center, Battle Creek, Michigan, and Gardiner General Hospital, Chicago, Illinois, from May 16th to 18th, under the direction of Colonel Peterson, assisted by Major Emma E. Vogel, Director of Physical Therapists, and Captain Mary Lawrence, Physical Therapist, both from the Office of the Surgeon General.

The following delegates attended the conference:

Ashford General Hospital
White Sulphur Springs, W. Va.
Capt. Carl Levenson, M.C.
Capt. Agnes Snyder, M.D.P.T.

Lawson General Hospital
Atlanta, Ga.
Capt. Arthur Pruce, M. C.
1st Lt. Constance Hagan, M.D.P.T.

Brooke General Hospital
Fort Sam Houston, Texas
Capt. Joshua Ehrlich, M.C.
Capt. Elsie Kuraner, M.D.P.T.

Fitzsimons General Hospital
Denver, Col.
Major Ora Huddleston, M.C.
1st Lt. Mary Menzel, M.D.P.T.

O'Reilly General Hospital
Springfield, Mo.
Capt. William McAuliffe, M.C.
Capt. Ethel M. Theilmann, M.D.P.T.

Army Medical Center
Major Donald Rose, M.C.
1st Lt. Emma Harr, M.D.P.T.
2nd Lt. Paige L. Weaver, M.D.P.T.

Bushnell General Hospital
Brigham City, Utah
2nd Lt. Maude Welling, M.D.P.T.

McCloskey General Hospital
Temple, Texas
Capt. James Scales, M.C.
Capt. Atha Scott, M.D.P.T.

McGuire General Hospital
Richmond, Va.
Capt. Thomas Dring, M.C.
1st Lt. Elizabeth Emory, M.D.P.T.

England General Hospital
Atlantic City, N. J.
Capt. Esther Anderson, M.D.P.T.

Kennedy General Hospital
Memphis, Tenn.
1st Lt. Ann Taylor, M.D.P.T.

Valley Forge General Hospital
Phoenixville, Pa.
1st Lt. Mary L. Ben Dure, M.D.P.T.

Hoff General Hospital
Santa Barbara, Calif.
Capt. Louise Christman, M.D.P.T.

Regional Hospital
Fort Bragg, N. C.
Capt. Margaret Whitehurst, M.D.P.T.

Lovell General Hospital
Fort Devens, Mass.
Capt. Virginia M. Greenwood, M.D.P.T.

Percy Jones Hospital Center
Battle Creek, Mich.
Capt. Robert Dow, M.C.
Capt. Margaret Rhodes, M.D.P.T.

Surgeon General's Office
Colonel Leonard T. Peterson, M.C.
Major Emma E. Vogel, M.D.P.T.
Capt. Mary Lawrence, M.D.P.T.

The program included discussion of the following subjects: The Physical Therapy and Occupational Therapy Programs for Amputees; Iontophoresis; Chest Conditions with Special Reference to Breathing and Other Exercises; Peripheral Nerve Injuries and Electrodiagnostic Tests; Physical Therapy Problems in Overseas Installations; Problems Pertaining to Physical Therapy Training Programs and the High Resistance-Low Repetition Exercise Program.

This conference was the first one of this nature to be conducted by the Medical Department of the Army. In view of the rapid expansion which has recently been accomplished in the physical therapy training program, it is felt that the opportunities provided by these meetings will prove to be timely and valuable.

Occupational Therapists and Physical Therapists Hold Joint Meeting

On May 29, 1945, a joint meeting of the District of Columbia Occupational Therapy Association and the District of Columbia Chapter of the American Physiotherapy Association, conducted under the direction of Miss Wilma West, President of the District of Columbia Occupational Therapy Association, was held in the Conference Room at the Walter Reed General Hospital, Washington, D. C.

The opening remarks by Miss West were followed by an address from Colonel Leonard T. Peterson, Orthopedic Consultant, Office of the Surgeon General. He briefly described the physical therapy program in Army hospitals and emphasized the importance of instructing patients in exercises to be performed so as to prevent atrophy and joint deformity. Following a short description of the Army's amputation program he presented the War Department film "Swinging Into Step" which depicts the life of an amputee from the time he enters the hospital until his return to civilian life. Major Donald Rose, Director of Physical Therapy at Walter Reed General Hospital, spoke on the Physical Therapy Training Conference at Percy Jones and Gardiner General Hospitals and made special reference to the "High Resistance-Low Repetition" exercise program conducted at the latter.

The meeting was the largest joint meeting held by these groups and was attended by all the military and civilian members of these two organizations as well as students attending local training courses.

"Physical Therapy for Amputees"

The Physical Therapy Branch of the Medical Department of the Army announces that T. B. Med No. 122 entitled "Physical Therapy for Amputees" is now available for purchase from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C.

Army Promotions

The Surgeon General of the Army announces the promotion of the following Medical Department Physical Therapists to the grade of First Lieutenant:

Stationed in the United States:

Albright, Muriel—England General Hospital, Atlantic City, N. J.
Blumenthal, Edna—Bushnell General Hospital, Brigham City, Utah.
Bower, Beulah—Lawson General Hospital, Atlanta, Ga.
Burmeister, Elizabeth — Thayer General Hospital, Nashville, Tenn.
Butler, Flora—Moore General Hospital, Swannanoa, N. C.
Byatt, Faye—Station Hospital, Pasadena Area, Calif.
Carter, Mildred S.—Station Hospital, Buckley Field, Calif.
Ehrhart, Alice—Ashford General Hospital, White Sulphur Springs, W. Va.
Elder, Ruth—McCloskey General Hospital, Temple, Tex.
Fisher, Anna E. — Foster General Hospital, Jackson, Miss.
Franzenburg, Ruth — Mayo General Hospital, Galesburg, Ill.
Gonser, Dorothy—England General Hospital, Atlantic City, N. J.
Hall, Louise—Oliver General Hospital, Augusta, Ga.
Hamlin Eleanor — McCaw General Hospital, Walla Walla, Wash.
Hillburg, Allene—Camp Gordon, Ga.
Kelly, Elizabeth S.—Lawson General Hospital, Atlanta, Ga.
Knight, Jeanne—McCloskey General Hospital, Temple, Tex.
Kuntz, Eleanor—Ashburn General Hospital, McKinney, Tex.
Lord, Iva A.—Kennedy General Hospital, Memphis, Tenn.
Mitchell, Lucy—Rhoads General Hospital, Utica, N. Y.
Monroe, Martha—Finney General Hospital, Thomasville, Ga.
Moriarty, Margaret—Kennedy General Hospital, Memphis, Tenn.
Noll, Dorothy V.—Camp Butner, N. C.
Page, Dorothy—La Garde General Hospital, New Orleans, La.
Paton, Ruby—Finney General Hospital, Thomasville, Ga.
Perry, Jacquelin—Fitzsimons General Hospital, Denver, Colo.
Renth, Anna—Fort Benning, Ga.
Richardson, Virginia — Kennedy General Hospital, Memphis, Tenn.
Roberts, Mary—Northington General Hospital, Tuscaloosa, Ala.
Rodenbaugh, Anne—Camp Shelby, Miss.
Schriber, Audrey—Kennedy General Hospital, Memphis, Tenn.
Skinner, Winifred—Battey General Hospital, Rome, Ga.
Small, Jessie M.—Oliver General Hospital, Augusta, Ga.
Swanson, Junia — Kennedy General Hospital, Memphis, Tenn.
Waggoner, Dorothy—Camp Roberts, Colo.
Wells, Isabelle—Camp Lee, Va.

White, Dorothy I.—Oliver General Hospital, Augusta, Ga.
Wood, Alice—Camp Edwards Conv. Hospital, Mass.
Wood, Jeanne—Northington General Hospital, Tuscaloosa, Ala.

Stationed Overseas:

Adams, Arline
Allen, Virginia
Ammerman, Elizabeth
Baab, Ellen
Bagly, Ruth M.
Bass, Ruth
Bayliss, Marie H.
Becklund, Laura M.
Blodgett, Bernice
Boortz, Pearl
Bostrom, Gladys
Brackett, Priscilla
Bryson, Ida
Burritt, Barbara F.
Bussemer, Mary
Casey, Eleanor
Casey, Helen
Cason, Audrey
Chase, Verena
Collins, Phyllis L.
Comer, Sue D.
Croy, Ann
Dennison, Eleanor
De Pouw, Loretta
Dineen, Sophie
Ditto, Agnes
Doyle, Margaret
Dudley, Eleanor
Duncan, Nancy
Durham, Hazel
Ellison, Dorothy
Embrey, Jeane
Farness, Laurine
Ferguson, Carol
Ferrer, Ruth
Finney, Opal J.
Fiscus, Edna
Gallan, Olga
Greiner, Lucile
Hardy, Verona
Helmick, Judith
Hoel, Nora
Holcomb, Florence
Houtz, Sara
Hovis, Gretchen L.
Iben, Alberta
Jameson, Ruth C.
Jenkins, Juanita
Johnson, Genevieve
Johnson, Grace
Johnson, Maybelle
Johnson, Nelda
Katz, Betty
King, Ruth
Koenig, Irene
Kohler, Ruth E.
Kotz, Dorothy
Kronemeyer, Lois J.
Kucen, Anna
Lahey, Helen
Lane, Barbara A.
Langford, Dorothy O.
Lee, Dorothy J.
Leitner, Anne
Leonard, Mary
Light, Dorothy
Lindberg, Geraldine
Lindholm, Virginia
Lister, Ruth
Lukonen, Sylvia
Lundberg, Alice
McCann, Elizabeth
McComb, Betty
Maag, Helen
Manning, Eleanor
Mashburn, Mary
Matthews, Anna
Mendler, Helen
Moffitt, Inez
Morgan, Elizabeth V.
Muir, Jean
Nord, Erika
Oak, Barbara
Pagendarm, Violet
Pang, Marion
Payne, Lorna
Porter, Kathryn
Putnam, Catherine
Quattlebaum, Anne
Randall, Virginia
Rice, Frances
Russo, Pauline
Safris, Mary
Sargent, Elizabeth
Sayward, Ernestine
Schwartz, Tova
Selvin, Dinah
Smith, Doris
Smith, Esther
Spensley, Carol
Tanner, Virginia
Taylor, Betty
Tearse, Patricia
Teasdale, Barbara
Tregale, Florence
Williams, Winifred
Woodward, Ruth

Commissioned Corps of Public Health Service to be Branch of Armed Forces

The commissioned corps of the United States Public Health Service will become a branch of the land and naval forces of the United States under an executive order signed by President Truman on June 21, 1945. The order will be effective July 29 for the duration of the war.

Administration of the Public Health Service is not affected by the executive order. The Service continues to operate as a part of the Federal Security Agency. Public Health Service officers will be subject to the Articles for the Government of the Navy, with authority conferred by the Articles and by law on the Secretary of the Navy and the Commander of a fleet vested in the Federal Security Administrator and the Surgeon General of the Public Health Service. Officers of the Public Health Service on detail to the Army and Navy, however, will continue to be governed by the laws of the service to which they are assigned.

Under the executive order, commissioned officers of the Service will be subject to the same discipline and obligations and will have the same status as members of the Army, the Navy, and the Coast Guard. Their postwar status will be the same as that of all other veterans. The order also establishes uniformity in discipline and benefits among Public Health Service commissioned personnel. Up to the present, commissioned officers detailed to the Army, Navy, and Coast Guard, and all officers serving overseas have received full military benefits under the Public Health Service Act of 1944. The remainder of the corps has been entitled to limited benefits only. As a result, detail has determined the military status of Public Health Service officers, although the officers have no control over their detail but perform the duties assigned them.

The commissioned corps totals 3,175, and is made up of physicians, dentists, sanitary engineers, pharmacists, scientists, and nurses. A large number of medical officers are engaged in direct care for the military forces. Practically all members of the corps are assigned to duties which have arisen directly out of the war effort. There is no enlisted personnel in the Public Health Service.

Since 1902, the President of the United States has been authorized by Congress to call upon the Public Health Service for direct military duty in time of threatened or actual war. In World War I, officers of the Service were made a part of the military forces by executive order. This action resulted from the realization that the close relationship between the Service and the military forces is not limited to individual officers detailed to the armed services but extends to the Public Health Service as a whole.

The Public Health Service operates the medical services of the Coast Guard in times of peace and war. The relationship of this service to the personnel of the Coast Guard is identical to the medical service supplied by the Bureau of Medicine and Surgery of the Navy to Navy personnel.

The text of the Executive Order of June 21, 1945, follows:

EXECUTIVE ORDER

Declaring the Commissioned Corps of the Public Health Service to be a Military Service and Prescribing Regulations therefor.

By virtue of the authority vested in me by section 216 of the Public Health Service Act, approved July 1, 1944, 58 Stat. 691; Title I of the First War Powers Act, approved December 1, 1941, 55 Stat. 838; and as President of the United States and Commander in Chief, I hereby declare the commissioned corps of the Public Health Service to be a military service and a branch of the land and naval forces of the United States during the period of the present war. The commissioned corps of the Public Health Service during such period shall be subject to the Articles for the Government of the Navy to the extent prescribed in the following regulations:

1. The Articles for the Government of the Navy are hereby adapted to apply to officers of the commissioned corps of the Public Health Service in the same manner and to the same extent as they apply to commissioned officers of the Navy under like circumstances.

2. Any member of the commissioned corps of the Public Health Service who violates any provision of the Articles for the Government of the Navy shall be subject to trial and punishment as prescribed therein. The authority conferred by the Articles for the Government of the Navy upon the Secretary of the Navy with respect to the convening of general courts-martial and courts of inquiry, the review of their proceedings and the confirmation, remission, mitigation, and execution of sentences of general courts-martial shall be vested in the Federal Security Administrator, and the authority conferred by law for such purposes upon the commander in chief of a fleet or squadron and other officers of the Navy shall be vested in the Surgeon General of the Public Health Service. The authority to convene a general court-martial or court of inquiry may not be delegated to any other officer of the Public Health Service.

3. The general courts-martial and courts of inquiry convened pursuant to this authority shall have the same powers and authority as other general courts-martial and courts of inquiry under the Articles for the Government of the Navy. The provision of Article 7 thereof shall apply in carrying out sentences of imprisonment and hard labor.

4. Commissioned officers of the Public Health Service now or hereafter detailed for duty with the Army, Navy, or Coast Guard shall be subject to the laws for the government of the service to which detailed as now prescribed by law. In the initiation, prosecution, and completion of disciplinary action, including remission or mitigation of punishments for any offense which has been or may be committed by any commissioned officer of the Public Health Service while detailed for duty with the Army, Navy, or Coast Guard, the jurisdiction shall depend upon and be in accordance with the laws and regulations applicable to the Army, Navy, Coast Guard, or Public Health Service, as the case may be, whichever has jurisdiction of the person of the offender at the various stages of such action: *Provided*, That any punishment imposed and executed in accordance with the provisions of this paragraph shall not exceed that to which the offender was liable at the time of the commission of the offense.

5. Naval Courts and Boards, 1937 and modifications or revisions thereof, shall govern the conduct of general courts-martial and courts of inquiry in the Public Health Service.

6. This order shall be published in the Federal Register and shall be effective on and after the thirtieth day following the date of such publication.

THE WHITE HOUSE
June 21, 1945.

"Straight from the Start"

A revised edition of "Straight from the Start" by Mrs. Mabel Fitzhugh (whose article on "Sitting and Sleeping Habits of Children" appeared in the May-June 1945 issue of the REVIEW) has recently been published. This is a very interesting and instructive pamphlet on posture from birth to early adolescence and is very well and amusingly illustrated. Reprints are obtainable from the publisher—Department of Public Health, Bureau of Maternal and Child Health, 760 Market Street, San Francisco 2, Calif.

Baruch Teaching Fellowship

Mrs. Roxie Morris, instructor in physical therapy at Children's Hospital, Los Angeles, Calif., has been awarded the Baruch Teaching Fellowship. Mrs. Morris will begin her studies this Fall.

Physical Therapy and Orthopedic Nursing

How does physical therapy differ from orthopedic nursing? This and other questions regarding orthopedic nursing is answered in a ten-page paper pamphlet on "The Nurse in the Orthopedic Field" which will be sent on request by the Joint Orthopedic Nursing Advisory Service, 1790 Broadway, New York 19, N. Y.

The Children's Rehabilitation Institute, Baltimore, Maryland, is very much in need of physical therapists for their permanent staff. The Institute is limited to the treatment of children with cerebral palsy. Anyone interested should contact Dr. Winthrop M. Phelps, 3038 St. Paul St., Baltimore 18, Maryland.

New Members

The following are newly accepted members of the American Physiotherapy Association:

Abraham, Mrs. Hilde, 628 West 114th Street, New York, N. Y.
Allen, Mary H., Station Hospital, Drew Field, Tampa, Fla.
Bassett, Eva E., 305 Spring Street, Pullman, Wash.
Bortot, Josephine M., 13th WAC Hospital, Deshon General Hospital, Butler, Pa.
Carlos, Margaret P., 167 Morewood Avenue, Pittsburgh 13, Pa.
Carr, L. Bernice, 1416—1st Street S.W., Rochester, Minn.
Charleson, Diana A., Nurses Basic Training School, Tilton General Hospital, Fort Dix, N. J.
Colby, Joy B., 1883 Pinehurst Street, St. Paul, Minn.
Crosswell, Mildred E., 1234 Lake Shore Drive, Chicago, Ill.
Dell, Yvonne E., Station Hospital, New Orleans, La.
Donahoe, Mrs. Vlasta E., 229 First Avenue North, Seattle, Wash.
Eaton, Lt. Carol, Overseas.
Forsyth, Rosemary E., Baxter General Hospital, Spokane, Wash.
Frankley, Gerda M., 76-36 113th Street, Forest Hills, L. I., N. Y.
Garcia, Ethel F., Del Norte, Colo.
Glass, Mrs. Suzanne, 2741 Clay Street, San Francisco, Calif.
Grabner, Audrey U., Monroeville, Ind.
Grundemann, Norma M., Mayo General Hospital, Galesburg, Ill.
Hopkins, Mrs. Helen C., 3507 S. W. 11th Street, Portland, Ore.
Ionta, Margaret L., AAF Regional Station Hospital, Orlando, Fla.
Jenkins, Lt. Juanita, Overseas.
Jones, Betty Ann, Hotel Albert, 10th and University Place, New York 12, N. Y.
Kester, Betty, Savage, Minn.
Kussevich, Zora M., 3808 Clay, San Francisco, Calif.
Levy, Betty, New York State Reconstruction Hospital, West Haverstraw, N. Y.
Lewis, Elizabeth M., 2024 Collingwood Boulevard, Toledo, O.
Lloyd, Lois, Box 11, Palerno, Calif.
Lockwood, Lt. Janet, Tilton General Hospital, Fort Dix, N. J.
Orth, Betty, 503 - 11th Avenue, Texas City, Tex.
Porter, Kathryn Jane, Overseas.
Powell, Velma L., Clarksburg, Mo.
Sams, Josephine L., 6020 Rockhill Road, Kansas City, Kans.
Snyder, Betty L., New Springfield, O.
Taibl, Raymond, 560 Roxsbury Place, Mount Washington, Baltimore, Md.
Tarr, Irene, 610 Castillo, Hill Top House, Stanford University, Calif.
Toussaint, Diane M., Station Hospital, N.O.P.E., New Orleans, La.
Turnbaugh, June E., 1504 East 26th Place, Tulsa, Okla.
Vandetti, Gerald C., Overseas.
Wahlroos, Lt. Viena C., Overseas.
Wert, Georgia M., Station K, R. R. #9, Box 769, Shepherd Road, Mt. Airy, Cincinnati, O.
Willer, Lt. Ruth L., Overseas.
Williams, Mayelle, 1003 E. Ivy Street, St. Paul, Minn.
Wilmarth, Jeanette E., 53 Washington Square South, New York, N. Y.
Wilson, Virginia, 502 South Main Street, Ada, O.
Worsley, Evelyn, 719-5th Street S. W., Rochester, Minn.

Recent Graduates of Fitzsimons General Hospital, Denver, Colo.:

Baden, Jane T.	Phillips, Kathryn E.
Bletcher, Aline F.	Reichard, Josephine E.
Caviani, Evangaline	Saethre, Olive E.
Eckelson, Rosalie	Slack, Doris Ann
Higgins, Rebecca	Smith, Edna Louise
Keating, Alice T.	Taylor, Beth E.
LaRowe, Esther M.	Way, Elizabeth Jane
Meydam, Jean	Weed, Evelyn Jean
Norton, Mary Ruth	

Recent Graduates of Northwestern University Medical School, Chicago, Ill.:

Augustus, Joan Wells	Howard, Jessie
Blue, Mary M.	Krance, Mary Anne
Brown, Alice	Kuhlmann, Louise M.
Butrim, Helen J.	Meloy, Aurelia D.
English, Eleanore H.	Rogal, Anne
Ferguson, Celia M.	VanderZalm, Christine
Gotaas, Bernice	

Recent Graduates of Bouve-Boston School of Physical Education, Boston, Mass.:

Baldwin, Elaine	Schneider, Mariana
Bogue, Barbara	Taber, Alice L.
Dwinell, Mary	Warren, Anne
Johnson, Jermain D.	

Recent Graduates of Harvard Medical School, Boston, Mass.:

Barley, Priscilla E.	Jenny, Mrs. Agnes R.
Bugbee, Margaret	Munn, Beverly
Bultman, Dorothea	Ober, Elizabeth K.
Ciejka, Julianne C.	Radlow, Sophie
Combs, Barbara Jane	Randall, Esther
Cullinan, Veronica	Rought, Elizabeth G.
DeVries, Sue	Sinervo, Ingrid I.
Fair, Mary T.	Staver, Marilyn A.
Harmuth, Elizabeth C.	Tompkins, Barbara

Recent Graduates of Boston University, College of Physical Education for Women, Sargent College, Cambridge, Mass.:

Brasher, Irene M.	Hyman, Eleanor
Bullard, Mary Elizabeth	Kellam, Cynthia
Casey, Anna	Langdon, Mrs. Priscilla
Clark, Mrs. Mary B.	Marciniec, Jennie
Cohen, Bernice B.	Martin, Wyndham
Coulthurst, Laura	Massey, Ruth Farley
Couture, Marilyn M.	Moody, Vernicce L.
Dand, A. Margaret	Stadfeld, Mrs. Shirley
Fellers, Mary Josephine	Sweeney, Mary
Fletcher, Sally Anne	Wilson, Mrs. Theo. H., Jr.

Recent Graduates of Brooke General Hospital, San Antonio, Tex.:

Anderson, Virginia	Nichols, Patricia E.
Glidden, Dorothy	Shaffer, Gertrude Leith
Hamilton, Ruth Ann	Thompson, Lois R.
Jencks, Ruth F.	Wight, Beverly Jane

Recent Graduates of Richmond Professional Institute, Richmond, Va.:

Benedict, Margaret	Jameson, Elizabeth A.
Booth, Pollyanna	Motch, Margaret E.
Horwitz, Sylvia	Ullmann, Audrey A.

Index to Current Literature

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ABSTRACTS

John S. Coulter, M.D.

Effects of Electrical Stimulation on Denervated Skeletal Muscle

W. H. Wehrmacher, B.A., J. D. Thomson, Ph.D., and H. M. Hines, Ph.D., Iowa City. In ARCHIVES OF PHYSICAL MEDICINE, 26:5:266, May 1945.

The results of this investigation clearly indicate that the atrophy of muscle following denervation can be appreciably retarded by electrical stimulation. The effectiveness of the treatment appears to depend on the extent to which tension is developed by the muscles during their treatment. The duration of an effective period of treatment can be very short if the muscles are stimulated under conditions which permit the development of maximal isometric tension. The most important factor in treatment would appear to be the quantity of tension developed rather than the particular kind, frequency or phase pattern of the electrical stimuli. In some respects the retardation of atrophy by electrical stimulation suggests an analogy to the charging of a wet storage cell.

That electrical stimulation results in a conservation of a large mass of functional tissue is supported by the findings that such muscles possess normal water contents and increased concentrations of creatine and are stronger than their untreated controls. However, such muscles are stronger because of their greater mass rather than because of any improvement in the functional capacity of the tissue itself. Our results confirm those of Fischer in the observation that electrical treatments adequate to retard atrophy fail to check the gradual loss of strength per unit mass of tissue which occurs after denervation.

It is believed that these findings offer some suggestions for the selection of an effective regimen for the treatment of muscles after peripheral nerve injuries. In general, the most effective stimulus modality should be the one which causes the development of the greatest amount of tension by the muscles. The findings point out the futility of employing stimuli which elicit only feeble contractions and suggest that the effectiveness of the treatments would be independent of the kind and frequency of the electrical stimuli employed provided comparable amounts of tension were developed by the treated muscles. The muscles to be treated should

be weighted or restrained in a manner which will allow the greatest amount of stretching permitted within physiologic limits. The total number of the stimuli can be small and the duration of the treatments can be very brief. Nothing would appear to be gained by prolonging the treatments beyond a certain minimal duration.

Carpal Bone Injuries

John D. Sherrill, M.D., Birmingham, Alabama. In SOUTHERN MEDICAL JOURNAL, 38:5:312, May 1945.

(1) Wrist sprain should not be diagnosed until the x-rays are negative.
(2) If pain persists, films should be made at intervals even though the original film was negative.
(3) In fractures of the lower end of the radius or ulna, look for associated carpal injuries.
(4) Conservative treatment of fresh fractures of the scaphoid and closed reduction of dislocated semilunars is the treatment of choice.
(5) Conservative treatment is advisable in nonunions of the scaphoid if there is reasonably good wrist function.
(6) Excision of one or more carpals is advocated in the treatment of comminuted fractures, dislocations of the semilunar or mediocarpal joint, if conservative therapy fails.

Modification of the Eve Method of Resuscitation

Captain S. B. Lapin, Medical Corps, Army of the United States. In THE BULLETIN OF THE U.S. ARMY MEDICAL DEPARTMENT, 89:111, June 1945.

The adoption of the rocking method of resuscitation by the Royal Navy has aroused much interest. In view of the success of the Schaefer technique used routinely in the United States, experiments were conducted and a method devised which, it is believed, incorporates the best points of both methods and represents an ideal technique of artificial respiration.

A folding trestle is attached to the sides of a standard Army litter. When opened and secured, the litter is supported on this "horse," fulcrumed as if it were an old-fashioned see-saw.

The subject is placed face-downward on the litter, after loosening his constricting clothing, belts, collar, and necktie.

The advantages of this method are: accessibility and ease of operation with no fatigue to the operator; pressure is equal, easily regulated, and maintained; massage with tonic effect on the cardiac musculature; compression of the thoracic cage at the exact time that the diaphragm is being pushed upward by the weight of the intestines; quick release of pressure on the thorax while the diaphragm is dropping, allowing for expansion of the lungs to their fullest extent; increased circulation to the brain with therapeutic effect on concurrent cerebral anemia (shock); easily improvised; ability to keep patient warm and dry by covering during resuscitation; easy transportation of apparatus.

Functional Treatment of Fractures and Other Injuries

Edward Harlan Wilson, M.D. In ARCHIVES OF PHYSICAL MEDICINE, 26:6:352, June 1945.

Fractures close to or involving a joint will continue to require splinting. Open reduction, when feasible, will often permit earlier motion and return of function. Early motion after manipulative fractures near the wrist and ankle is to be decried; it merely leads to prolongation of the recovery period. Open reduction of all fractures is increasing.

Physical therapy has a very important place in rehabilitation. It is largely a psychotherapeutic method, in that the patient is educated to begin to use his muscles in the region of a fracture and is taught how to do so without pain or injury to himself. Hypertrophy of the wasted muscle is encouraged. Its use, especially early in fracture treatment, should be limited to assisted active motion with the patient's sense of pain as the guide to the limit of motion. When the patient has definitely learned to move his limb and to place weight on it, physical therapy has accomplished all that it can and its further use will tend to retard the patient's progress because his condition combines local weakness and stiffness with general weakness due to his prolonged period of rest. The experience of the British in this war in the use of rehabilitation camps, and more recently the experience of our own Army, has emphasized the importance of prolonged and extremely active physical exercise. This has been obtained by early marching drill, even for men in casts, with the prompt addition of graduated games such as volley ball and tennis, sawing lumber, swimming, etc., until the patient is active about six hours a day, which is the limit of his endurance. By the use of these methods tremendous progress has been made in the rehabilitation not only of injured limbs but of men themselves. To consolidate these gains for civilian life it will now become necessary to develop rehabilitation centers in industrial cities where not only physical therapy and occupational therapy are furnished but also exercise which exploits the patient's liking for competition and fun.

Myositis in Chronic Rheumatism and Chronic Gout

Frank Hopkins, M.D., Hot Springs, Virginia. In VIRGINIA MEDICAL MONTHLY, 72:6:262, June 1945.

It is disastrous to immobilize muscular inflammation, as it increases blood stasis and therefore results in further exudates and increased pressure. During the very acute stage, the pain will splint the part sufficiently, and as the pain recedes, motion should be reestablished as fast as possible. In other words, drainage of the tissues is essential for relief.

Lumbar myositis sometimes produces pain over the abdomen simulating an acute surgical condition. Occasionally, there is an almost constant dull ache over the abdomen.

A very important manifestation is sciatica. The majority of the cases of sciatica come from infiltration of the lumbar and gluteal muscles, but myositis anywhere along the course of the nerve may cause sciatica.

The shoulder muscles are frequently attacked, the deltoid being the favorite target; and if the condition is chronic, the fibrous tissues may be involved.

Physical therapy is the only effective treatment.

Colles' Fractures

J. Warren White, M.D., Greenville, South Carolina. In SOUTHERN MEDICAL JOURNAL, 38:6:417, June 1945.

(1) Do not attempt reduction without x-rays.
(2) Do not attempt reduction without an anesthetic.
(3) Do not stop short of anatomical reduction.
(4) Do not use splints if plaster is available.
(5) Do not take the cast off too soon.
(6) Do not forget to tell the patient to move his fingers.
(7) Do not use too strenuous physical therapy actively or passively.
(8) Do not resort to subsequent surgery in older people.

Therapeutic and Remedial Exercises

Frank H. Ewerhardt, M.D., St. Louis. In JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, 128:3:204, May 19, 1945.

Active, voluntary purposeful movements are initiated by mental processes. They affect the upper and lower neurons, the motor and sensory nerves, the myoneural junction and the muscle itself. Neither passive movements nor muscular action initiated by an electrical impulse can so exclusively and favorably influence the neuromuscular arc.

Occupational therapy permits and may augment active exercise. Skills and crafts can be taught and learned by the use of hands and legs.

Passive movements are performed by an operator without the assistance or resistance of the patient. This action must not be confused with manipulation of a joint limited in motion due to fibrous adhesions of extracapsular or intracapsular origin.

Resistive movements are those in the course of which the technician resists the efforts of the patient, or vice versa. The technician offers just as much resistance as the patient is able to overcome. In certain pathologic conditions these movements have distinct advantages over the active voluntary type of exercise.

(a) Single muscles or groups of muscles can be caused to function to an optimal degree because of a more complete relaxation of the prime movers and a consequent lessened resistance. This phenomenon is due to the operation of Sherrington's law of reciprocal innervation. The technician resists to a degree permitting the greatest range of motion.

(b) By the same token protective spasm may be lessened. For example, resistance to knee flexion relaxes the overactive quadriceps.

(c) The work done by the muscles can be graduated to any amount desirable.

(d) By virtue of a and c resistive movements offer an excellent method of studying muscular action and relative strength.

Assistive movements, as the name implies, are useful in supplementing voluntary effort where normal muscle power is deficient.

Isometric muscular contraction currently has been unsatisfactorily termed "muscle setting." The muscle is contracted but does not involve joint action.

In treating weak muscles by means of active exercise there is always a danger of overtaxing and causing exhaustion which would hinder the progress of the recovery. So as to minimize this danger it has been found helpful to employ certain procedures with an aim to lessen the factors of gravity and friction. The following are those commonly employed, which in turn may suggest others to the reader:

(a) Postural.—The aim is to place the body in a favorable position, thereby eliminating gravity to a greater or lesser extent.

(b) Sling Suspension.—Still another method is to suspend the extremity in a sling about 6 inches from the bed or table, thus removing the element of gravity.

(c) Underwater Exercises.—Exercise in the pool must not be confused with swimming. It is useful because the buoyancy of the water lessens gravity and makes possible the application of therapeutic exercise.

Since it is of great importance to guard against exhaustion, special attention should be focused on the following precepts: Exercise may be carried to the point of fatigue, but not beyond; the greater the frequency of contraction, the more rapid the approach of fatigue; the more complete the exhaustion, mental or muscular, the longer the period necessary for recovery; and the more complex the discriminations required in a performance, the more rapid the onset of fatigue.

Corrective Cast for Treatment of Low Back Pain

Emil D. W. Hauser, M.D., Chicago. In JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, 128:2:93, May 12, 1945.

Low back pain, in most cases, is due to a strain which causes an inflammation in the region of the lumbosacral and sacroiliac articulations. Strain is the result of an imbalance between the capacity of the structures of the back and the physiologic demands made on them. This imbalance is called a functional decompensation. A decompensation of the back gives rise to certain symptoms and findings.

The treatment of low back pain, therefore, consists in correction of the deformity, relief of the strain at the sacroiliac and lumbosacral joints and elimination of the decompensation of the back. This is accomplished by means of a so-called active cast. An active cast is one which is applied with the body in a position such that the natural forces of the body will act against the cast. In this way the cast has the effect of exerting a corrective force.

The cast exerts forces to correct the deformity of the back and at the same time relieves the strain on the joint so that the inflammation can subside. Since the trunk is extended and the body is higher than before the application of the cast, more work is required to hold the upright position. This brings about an increase in the demand on the muscles, which acts to strengthen these structures. This increase in strength is further abetted by means of graduated exercises, alternated with periodic rests to prevent muscular strain.

This treatment by active cast has been applied in 2,626 cases. Excellent results were obtained in 35.6 per cent of the cases.

Restoration of Functions of Limbs

A. N. Leontiev, Professor of Moscow University. In THE MILITARY SURGEON, 96:5:399, May 1945.

One of the consequences of wounds to the arms is frequently a contraction of the muscles so that the joints become "fixed" and it is no longer possible to use the limb. After everything has been done to restore the arm anatomically, the problem of restoring its functions still remains. The functions are not restored automatically once the damaged tissue has been healed, but special methods based on physical exercises have to be employed.

The problem of restoring the functions of an injured arm therefore is one of tomorrow as well as of today, and for many wounded men this is a question of their fate in life.

Last year a group of scientific workers of the Institute of Psychology of Moscow University undertook the study of this problem under the guidance of the present author.

It is worthy of note that the functional restoration of movement gives, according to the experiences of one of the hospitals in the rear areas, very practical results. Wounded arriving at this hospital were all unable to use their arms for complicated working movements; after treatment 75 per cent recovered use of their arms and another 14 per cent who had entered the hospital with their arms completely incapacitated had movement restored sufficiently to enable them to use their arms in various labor processes.

Etiology and Prevention of Thrombosis of Deep Leg Veins

W. C. Hunter, J. J. Krygier and J. C. Kennedy. In SURGERY, 17:153-318, Feb. 1945.

Hunter and his associates present a comparative study of the incidence of venous thrombosis in the legs in 400 unselected necropsies on adults performed before and after preventive measures were instituted. In the first group the authors routinely removed the calf muscles in order to test their conviction that the most important etiologic factor in phlebothrombosis of the lower extremities is confinement to bed for more than a brief period. The second study was extended to include dissection of the femoral veins and those of the abductor muscles, shown by Frykholm to be almost as frequently occluded as the major veins. The authors found that phlebothrombosis of the lower extremities begins in the deep vessels of the calf and tends to propagate toward the heart, and that thrombosis of the femoral veins alone is an uncommon occurrence. Thrombosis of the deep veins of the leg is a frequent event in all classes of middle aged and older patients who must go to bed for longer than a few days. The onset is insidious and without prominent symptoms. Phlebitis, as a cause or as a complication of deep extremity vein thrombosis, is uncommon and for this reason is unimportant. The logical approach to the problem of phlebothrombosis and pulmonary embolism is prophylactic. The authors stress the importance of leg exercises after operations and in other bedfast patients. Reeducation of physicians and nurses with respect to the causes of thrombosis of the legs is urgently needed. The incidence of phlebothrombosis in medical patients proved to be significantly less than it was in the first 200 cases. It seems probable that the institution of active exercises for this group is responsible for the decrease.

Prostatitis and Seminal Vesiculitis as Common Causes of Backache

William H. Mast, Lt. Comm. (MC), U.S.N.R., and William C. Hurly, Lt. (MC), U.S.N. In UNITED STATES NAVAL MEDICAL BULLETIN, 44:5:1005, May 1945.

A frequent and elusive complaint in the Navy is that of backache. Usually the x-ray is not informative, and treatment by heat, analgesics or taping the back affords no relief. The purpose of this paper is to offer an approach to backache which in experience here has relieved a high percentage of cases.

Local heat, sitz baths and diathermy were employed more for the comfort of the patient than for definite therapeutic effect. Various rectal electrodes are not considered necessary for cure, and intra-prostatic injection of antiseptics is considered unwise despite favorable reports by a few investigators.

Rehabilitation in a Naval Hospital

H. Jackson Burrows, M.D., Camb., F.R.C.S., Surgeon Commander RNVR; Assistant Orthopedic Surgeon, St. Bartholomew's Hospital, London. In THE LANCET, 12:1:371, March 24, 1945.

In their more restricted sense, the rehabilitation treatments here are divided for convenience into: (1) recreational treatment, (2) physical therapy, and (3) occupational therapy.

Much the most important part of the physical therapists' duties is instruction in and supervision of progressive exercises—a function which seems to be denied them in some rehabilitation centers, where they have become mere rubbers and electricians. The opposite popular tendency—the almost total neglect of such accessory methods as heat and electrical stimulation—also is avoided.

Passive movements (except as manipulations under anesthesia) generally are banned in favor of movements which can be carried out voluntarily, but they are used, in suitable cases, for those physiological movements of joints which are without direct muscle control, and also extensively in paralytic cases before the stage at which reeducation becomes possible. The fashionable condemnation of passive movements has been much too sweeping, with disastrous consequences for some patients with lower motor neurone paralysis.

Records.—During the recovery of joint injuries—accidental or operative—the girth of the joint, the girth of the muscles, the angle of movement, and the muscle power are measured weekly by one physical therapist, using standardized methods, and the measurements of normal and pathological limb are charted. The charts are valuable, especially in recording the progress of muscle power, a factor which too often is neglected in assessing a patient's fitness for duty.

Adhesive Capsulitis of the Shoulder: A Study of the Pathological Findings in Periarthritis of the Shoulder

Julius S. Neviaser, M.D., Washington, D. C. In JOURNAL OF BONE AND JOINT SURGERY, 27:2:221, April 1945.

This study of "frozen shoulder" was undertaken to clarify the pathology and is not offered as a method of treatment. The results demonstrate that the lesion is not a periarthritis, but the essential pathology is a thickening and contraction of the capsule which becomes adherent to the humeral head. Microscopic sections confirm the presence of reparative inflammatory changes in the capsule. In some cases there also are similar changes in the wall of the subacromial bursa. During manipulation of a "frozen shoulder" under anesthesia, the capsule is separated from the head in much the same way that adhesive plaster can be torn away from the bare skin. Once this separation has occurred, motion of the head within the joint is free.

The term "adhesive capsulitis" is suggested as descriptive of the pathology of "frozen shoulder."

The Effect of Electrical Stimulation upon Strength Loss in Denervated Rat Muscle

Salvador Arana Soto (by invitation), A. J. Kosman (by invitation), S. L. Osborne and A. C. Ivy, Dept. of Physiology, Northwestern Univ. Medical School, Chicago, Ill. In FEDERATION PROCEEDINGS, 4:1:67, March 1945.

The sciatic nerve was sectioned bilaterally in 64 male albino rats and the loss of tension in both gastrocnemii was determined at various stages of atrophy. The greatest strength loss occurs in the first 15 days following denervation (72.3 per cent). At the end of 30 days the denervated muscle retained only 14.8 per cent of its original tension.

In another group of rats the denervated gastrocnemius on one side was stimulated once daily for 15 minutes with a surging 25 cycle alternating current producing 40 contractions a minute. The opposite denervated muscle served as the untreated control.

Electrical stimulation of the denervated rat gastrocnemius with a 25 cycle alternating current retards the weight and strength loss of the muscle. (Supported by a grant from the National Foundation for Infantile Paralysis, Inc.)

Results of Modern Methods of Treatment of Poliomyelitis

Robert W. Johnson, Jr., M.D., Baltimore, Maryland. In JOURNAL OF BONE AND JOINT SURGERY, 27:2:226, April 1945.

One positive benefit from a crusade of the Sister Kenny type is that it makes us reexamine our own therapeutic procedures to find out if time, fashion, or carelessness has led us astray in any particular. So far we have remained unimpressed by the claims of superiority of the Sister Kenny treatment.

Certain fundamental facts about poliomyelitis should be stressed:

1. Patients are not cured; they recover, and we assist in the recovery.

2. It is more important for a badly paralyzed patient to recover to 80 or 90 per cent of normal, than for a slightly weakened patient to make a complete recovery. Therefore, our figures are not rated in case units, for in this way misleading statistics may be produced.

3. The proper unit is the weakened or paralyzed muscle itself, and recovery is judged on final muscle power as compared with the original degree of paralysis. Each muscle's record in each case is kept separately, and analyses and comparisons can be made with these definite units without the introduction of variables. In this way, can be determined the overall percentage of recovery, the recovery of the upper as compared to the lower extremity, the recovery of trunk and abdominal muscles, the rate of recovery, the effect of use, exercise, and other factors on recovery, and the prognosis for individual muscle recovery.

Inasmuch as these records provide us with almost astronomical figures, as they involve more than 100,000 checks on muscles, we have selected for this analysis ten commonly paralyzed and very important muscles: gluteus maximus, gluteus medius, quadriceps, hamstrings, gastrocnemius, tibialis anterior, deltoid, biceps humeri, triceps brachii, and opponens pollicis.

Conclusions

1. All muscles, even in a widespread, complete paralysis of entire extremities, should have three months of careful and painstaking protection and treatment comparable to that given in peripheral nerve lesions.

2. At the end of such a three months' regimen, a very accurate prognosis of recovery can be arrived at, for the muscles can then be differentiated into three categories:

   a. Those which have not recovered to a point of 30 per cent of power in three months. No return of useful power is to be expected; and these make up the group of the permanently paralyzed extremities.

   b. Those which by this time have 80 per cent or more power, and can be counted on to function satisfactorily without any further treatment except general supervision.

   c. The group which has demonstrated some return of power and has a three-month level of 30 to 75 per cent. These have potentiality for further recovery to a point where useful function can be restored. These cases are the crucially important ones as far as further active treatment is concerned, and every effort should continue to be expended on this group to build up power and develop hypertrophy of the active muscle tissue persisting, and to protect these patients against overfatigue and postural strain during at least the next year.

3. No appreciable recovery continues beyond eighteen months, even under ideal conditions, but untreated or inadequately treated cases have been salvaged by this regimen as late as six to ten years after the acute attack, indicating a previous nerve recovery which had been masked or nullified by the overstretching or overfatigue of the muscle or by opposing contracture.

4. On occasions we have observed loss of power in muscles of our own cases from overfatigue and too early removal of support, with permanent damage in some few instances, again demonstrating the need for careful supervision during recovery.

The Effect of Temperature on the Artificial Synapse Formed by the Cut End of the Mammalian Nerve

Ragnar Granit and C. R. Skoglund, from the Neurophysiological Laboratory, Karolinska Institutet, Stockholm, Sweden. In JOURNAL OF NEUROPHYSIOLOGY, 8:3:216, May 1945.

At least three factors may contribute to developing the facilitatory effect of cold. There is first the increased spike height and increased spike duration of the action potential in a cooled region of nerve, demonstrated with a single fiber preparation by Schoepfle and Erlanger. Secondly, the lowered accommodation, mentioned above. This effect on accommodation may be due to the possible third factor, known since the days of Du Bois-Reymond and Bernstein. This is that a difference of potential can be noted between a cold and a warm region of a nerve. These temperature potentials were later studied by Verzar, Kolb and Bremer and Titeca. We confirmed them preliminarily in these experiments with an instrument of limited sensitivity and have now taken up temperature potentials for a detailed investigation.

When the artificial synapse, formed by the cut end of the cat's sciatic, is cooled, transmission across it is facilitated so that the relayed volleys increase in size. Conversely, they diminish in size when the synapse is warmed.

Infections and Surgery of the Hand

Thomas J. Snodgrass, M.D., F.A.C.S., Janesville. In THE WISCONSIN MEDICAL JOURNAL, 44:5:507, May 1945.

The subject of infections and surgery of the hand is one of great importance and of equal magnitude. In a limited discussion it is necessary to outline the types of infection encountered in the surgery of the hand, discuss the general principles in their management, and cover briefly the treatment of acute injuries involving the soft parts of the hand.

Moist, hot packs.—The moist, hot packs which are used most commonly in the treatment of infected hands can be greatly overdone. Soaking over a period of more than forty-eight hours and failure to elevate properly may result in a swollen, wrinkled, and soggy hand in which it is difficult to recognize the area of localization, and in an edema which may be more or less permanent. Adequate immobilization by splinting and elevation, with moderate intermittent moist and dry heat, will prove effective.

Without going into any detailed description of the procedures in infections and surgery of the hand, I have attempted to show the importance of immobilization, splinting, elevation, early accurate drainage of the areas of suppuration, and the use of the sulfonamides, both general and local, with the addition of zinc peroxide in the anaerobic infections. I have further emphasized that acute injuries to the hand require the most careful, intelligent, surgical management, and that no attempt should be made to repair tendons and nerves unless the facilities at hand are such that complete success of the operation is reasonably assured.

Peripheral Nerve Injuries

Major Frank H. Mayfield, MC, AUS, Cincinnati, Ohio. In THE JOURNAL OF THE MICHIGAN STATE MEDICAL SOCIETY, 44:3:275, March 1945.

Reconditioning

Rehabilitation must begin at the time of injury by preventing deformity and fixation of joints. Fractures of bones which require fixation in plaster, in association with nerve injury, are common. However, few require that the finger joints be encased, and this should be avoided. The patient should be instructed to use the unparalyzed hand for passive exercise of the paralyzed part. We have just completed the review of 100 cases of injury to one or more of the major nerve trunks of the hand. In 20 patients of this group, disabling stiffness of the finger joints existed. An analysis of their case histories made it clear that only one important principle of treatment had been violated; namely, they had not been instructed and required to passively exercise the paralyzed extremity.

Passive exercise to the foot is best applied by walking—all patients who can support themselves are fitted with appropriate splints and required to walk. We are convinced that passive exercise supersedes all other forms of physical therapy.

Splints

It is imperative that patients wear appropriate splints to prevent overstretching of paralyzed muscles and contractures of unparalyzed muscles. An elastic cock-up splint which was developed at Percy Jones Hospital is used for radial palsy. The wire drop-foot brace is used for peroneal paralysis. The airplane splint is worn by all cases with deltoid paralysis. There is no satisfactory splint for median and ulnar palsies. Full leg braces with knee drop locks are used for femoral palsies.

Calcification of the Tendon Cuff of the Shoulder

M. Beckett Howorth, M.D., Sc.D. (Med.), F.A.C.S., New York, N. Y. In SURGERY, GYNECOLOGY AND OBSTETRICS, 80:4:343, April 1945.

Pain and spasm may be relieved in some cases, especially the acute ones of short duration, by any one of several treatments.

Heat, in the form of a lamp, hot water bag, electric pad or hot packs, may provide some relief. Short or long wave diathermy may relieve some shoulders and may even be followed by absorption of the calcareous material in the early acute ones. However, an acute shoulder, with inflammation of the bursa or tension in the tendon, often is made worse by heat.

Cold usually is more comforting than heat, especially in the very acute cases. Ice packs may be used, but the ethyl chloride spray, as reported by Kraus, is usually more effective.

Massage of the bursal region is likely to increase the pain in most cases, though gentle massage of the adjacent muscles may be used to maintain muscle tone. Manipulation or stretching usually increases pain and spasm and often does more harm than good.

Exercises are of great value and are the most important of the various physical therapy measures.

The pendulum exercises are the simplest, easiest and least painful; they should be done with the arm in flexion and hanging loosely, i.e., with the trunk flexed or with the subject lying prone upon a table with the arm over the side.

Aspiration, irrigation or puncture of the calcified area may give relief, chiefly by the release of tension.

Nonsplinting Treatment of Elbow Joint Injuries

Thomas A. Boutrous, M.D., Surgical Resident, Redford Receiving Hospital; Alexander Blain III, M.D., Fellow in Medicine, Wayne University College of Medicine, and W. A. Chipman, M.D., Attending Surgeon, Redford Branch of Detroit Receiving Hospital, Detroit, Michigan. In AMERICAN JOURNAL OF SURGERY, 68:2:213, May 1945.

Conventional methods of treating injuries and fractures about the elbow joint leave much to be desired. These injuries often are followed by undesirable sequelae ranging from various degrees of dysfunction to the dreaded ischemic contractures of Volkman. Downer states that "at the Alexander Blain Hospital conventional splinting of elbow joint fractures has not led to entirely satisfactory results by any means." This is true in the experience of numerous other surgeons.

While the patient was still in the hospital, it was decided to use the nonsplinting method of treatment for other fractures about the elbow joint because of the excellent results noted, and because of the dysfunction so often encountered in the past with splinting methods.

In all the following cases it was obvious during the first few days that the patients were timid about active and passive motion. Consequently, especially in the younger age group, close observation was necessary. All the patients were encouraged to take the arm out of the sling four or five times a day and carry out either active and/or passive motion (all positions). The earlier the motion the better and more rapid was the restoration of function.

Treatment of Fractures of the Tibial Condyles

Robert A. Knight, M.D., Memphis, Tenn. In SOUTHERN MEDICAL JOURNAL, 38:4:254, April 1945.

Postoperative Care and Results.—Early protected motion without weight bearing has been found to be the most satisfactory method of restoring function. Immediate postoperative immobilization consists of a long leg cast with a pelvic band with the knee in 15 degrees of flexion. In two or three weeks, after the wound has healed, the cast is removed and the extremity is suspended in balanced traction for active and passive motion. Daily physical therapy is given, the patient being instructed in quadriceps exercises, and care is taken to prevent forcible flexion of the knee. At the end of five to six weeks the patient is allowed up without weight bearing, wearing a long leg controldial knee brace.

The Effect of Various Types of Electrical Stimulation and of Frequency of Stimulation upon Muscle Atrophy in the Rat

A. J. Kosman (by invitation), S. L. Osborne and A. C. Ivy, Dept. of Physiology, Northwestern Univ. Medical School, Chicago, Ill. In FEDERATION PROCEEDINGS, 4:1:42, March 1945.

The sciatic nerve was sectioned bilaterally in three groups of 15 rats each. In one group, the denervated gastrocnemius on one side was stimulated with an "interrupted galvanic" current; in a second, with a "slow sinusoidal" current and in a third, with a 25 cycle alternating current. The greatest retardation of weight loss was obtained with the 25 cycle A.C. Of the other two types of current, both of which are in common clinical use, the "interrupted galvanic" is apparently more effective.

Increasing the frequency of treatments enhances the effectiveness of electrical stimulation in retarding muscle atrophy in the rat. (Supported by a grant from the National Foundation for Infantile Paralysis, Inc.)

Osteoarthritis of the Spine

Ernest Fletcher, M.A., M.D., M.R.C.P. Physician, Queen' Mary's Hospital, Stratford, London; Physician, British Red Cross Society's Clinic for Rheumatism, London; Physician (with Physical Medicine) Royal Free Hospital, London; Physician in Charge, Medical Division, E.M.S. In THE BRITISH JOURNAL OF PHYSICAL MEDICINE AND INDUSTRIAL HYGIENE, 8:2:51, March-April 1945.

The diagnosis of osteoarthritis of the spine is made fairly frequently, but it is not by any means the commonest of the medical locomotor disorders. In 1,500 carefully recorded cases of chronic rheumatism it occurred 84 times, 37 times in males and 47 times in females. This compares with 377 cases of infective arthritis in the same series, which also included 90 cases of ankylosing spondylitis. The average age at the time of onset was 55 years. The average duration of symptoms at the time of diagnosis was 23.6 months.

Summary and Conclusions

Anatomical evidence has been produced to show that osteophytic formation occurs in the short intervertebral ligaments and that this lesion has a certain incidence in the spine. Osteoarthritis of the apophyseal joints and its incidence is also discussed.

Clinical evidence is adduced which suggests that polyspondylitis does produce symptoms, although some workers maintain that it does not (Gordon). The symptoms of osteoarthritis of the spine are described, together with the physical signs. An attempt is made to correlate the clinical and anatomical findings. The radiographical viewpoint is considered and its difficulties are mentioned.

No attempt is made to assess treatment, but it is quite possible that separation of the two main forms of osteoarthritis of the spine may lead to modifications in treatment.

A Quick and Simple Treatment of Low Back Pain Based on a New Conception of Its Genesis

Aladar Farkas, M.D., and George W. Easley, M.D., Williamson, W. Va. In THE WEST VIRGINIA MEDICAL JOURNAL, 41:4:107, April 1945.

The routine of the treatment in more than 60 cases was as follows: After the clinical and x-ray examination the patients were placed in beds whose front legs were raised 12 to 20 inches. Beneath the mattress a board was placed. The patients retained a small cushion for their heads if necessary and were kept in bed day and night. Daily for twenty minutes a heat cradle was applied. The duration of the treatment varied from seven to fourteen days, but in no case exceeded a fortnight.

The pathogenesis of the low back complex (lumbago, sciatica, protruded disc) is explained on the ground of a primary lumber kyphosis, a straight lumbar spine preceding all signs and symptoms. The reverse of lumbar lordosis is caused by stooping and sitting occupations. Among the signs accompanying the disappearance of lumbar lordosis attention is called to the spasm of the lateral abdominal muscles and to the lumbar shift of the dorsal kyphosis. In more than 60 cases complete relief from the local and nervous symptoms could be obtained by putting the patient in a bed, the front legs of which were elevated from 12 to 20 inches for from seven to fourteen days. Recurrences were rare and easily handled by the same method.

Ischemic Nerve Lesions Occurring in Volkmann's Contracture

W. Holmes, W. B. Highet, and H. J. Seddon. In BRITISH JOURNAL OF SURGERY, Page 275, Oct. 1944.

Holmes and his associates report 6 cases of established Volkmann's contracture which have been investigated at the Oxford Peripheral Nerve Injuries Center. These cases were subjected to full clinical and operative investigation, and specimens of muscle and nerve were removed for microscopic examination. The nerves showed an unusual type of pathologic change which is believed to be due to ischemia and the characteristics of which have a direct bearing on the prospect of recovery. In every case the upper limb was affected. In 5 of the 6 cases damage to the main artery of the limb was demonstrated at the level of the initial injury. In all cases there was extensive motor and sensory paralysis, but in only 2 of them was there evidence of direct traumatic injury to the main nerve-trunk. In 1 of the cases the median nerve was constricted between the two heads of the pronator teres, but in no other was there any evidence of compression of nerves by contracture of muscle or involvement in scar tissue. Microscopic examination demonstrated destruction of axons and myelin sheaths as in uncomplicated wallerian degeneration. In the more severely affected nerves there had been a great increase in the collagen of the endoneurium, sometimes leading to complete collagenous replacement of the nerve bundle. In 1 case the nerve was entirely necrotic. These changes are due to ischemia. Sensory and motor recovery has been of poor quality because of the irreversible nature of severe degeneration. There is no effective treatment for established ischemic nerve degeneration.

Trench Foot

Major Frank K. Boland, Jr., Major Thomas S. Claiborne and Lt.-Col. Francis P. Parker, Medical Corps, Army of the United States. In SURGERY, 17:4:570, April 1945.

The treatment employed in this hospital was simple. The patients were grouped for treatment purposes into mild, moderate and severe types. Those with a mild type were kept in bed three to fourteen days. The feet were slightly elevated if there was any pain. A modified type Buerger's exercise was begun when the pain and swelling had diminished. As soon as possible the patients with no signs were encouraged to walk, first without shoes and later with their regular shoes. When they were able to walk one-half mile and soak their feet alternately in hot and cold water without return of symptoms they were ready for discharge to duty or to a convalescent hospital, depending on the toughness of their feet.

Six of our patients whose pain was not relieved with ordinary cooling were improved by the use of ice bags. Two patients who were seen early in our experience were interesting. They had only slightly swollen feet but they complained of severe pain. When they were not relieved of their pain by ordinary cooling they were given buckets of ice water and allowed to cool their feet. They received immediate relief of the pain but after several treatments the feet became swollen and blue. This form of therapy was discontinued. For those with more intense pain and severe swelling we now use dry cold in the form of protected ice bags and we have had no increase in the edema since the dry cold was used.

Research Council to Investigate Prosthetic Devices

In JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, 127:14:924, April 7, 1945.

At the request of the Surgeon General of the Army, the National Academy of Sciences and the National Research Council have organized a Committee on Prosthetic Devices. Here for the first time experts in the field of engineering will combine with surgeons and inventors to apply to the manufacture of artificial limbs the knowledge that has been gained in the fundamental sciences. The history of prosthetic devices indicates that there has been a failure to apply much of the knowledge that has become available. The tendency has been for manufacturers of devices to hold strictly to models which they have themselves developed and on which they might be able to establish patents. Brace makers and makers of artificial limbs frequently have held as trade secrets some of the improvements which they have developed and would teach them only to their own apprentices. Many new discoveries have been made in alloys of metals which would provide light weight, malleability, freedom from rust and other desirable factors. These have, however, been incorporated too infrequently in the making of prosthetic devices. The committee will aim to incorporate these new advances into the making of artificial limbs and to bring about as much standardization as possible in parts and mechanisms so as to assure simplification of maintenance and repair. The auspices under which this committee has been established and the inclusion of such names as those of Kettering, Magnuson, McClure and Wilson mean that progress will be made. The chairman is Dr. Paul E. Klopsteg, professor of applied science at Northwestern University, who gives assurance that the points of view of engineering, production, fitting and servicing, as well as the medical and surgical points of view, will prevail in the work of this committee.

Physiologic Effects of Carbon Dioxide Water Baths on Alveolar Carbon Dioxide Tension, Skin Temperature and Respiratory Metabolism

W. S. McClellan, M. A. Lessler and Alice T. Doulin. In AMERICAN HEART JOURNAL, p. 44, Jan. 1945.

McClellan and his coworkers report observations on changes which occur in the alveolar carbon dioxide tension, the skin temperature and the respiratory metabolism of human subjects who have been submerged in baths of either carbon dioxide water or plain water. The alveolar carbon dioxide tension showed a 5 to 10 per cent rise during baths in the carbon dioxide water and returned to the resting level about twenty minutes after the bath. There was no significant change during baths in plain water. While there was no essential difference in the skin temperatures during carbon dioxide and plain water baths, when bath temperatures were between 85 and 90 F. the skin temperature was from 0.9 to 1.8 degrees F. higher in carbon dioxide than in plain water when the baths were between 95 and 100 F. A hyperemia was noted over the immersed area of the skin when the patients emerged from the carbon dioxide water baths. This was noted at all the temperatures used and was not present when the subject emerged from the plain water baths. There was a considerable increase in the elimination of carbon dioxide in the expired air during the time the patient was in the mineral water bath. There was an increase in the respiratory minute volume during the mineral water bath which did not occur with the plain water bath. The evidence supports the theory that this extra carbon dioxide is obtained by absorption of the carbon dioxide in the water through the skin and its subsequent elimination through the lungs. The authors point out that justification for the use of mineral water baths containing carbon dioxide in the program of treating disorders of the heart and circulation has frequently been questioned by thoughtful physicians who say that the results are entirely due to mental and psychologic factors. The authors think that the data presented in this communication show that they have definite physiologic effect.

Spa Therapy of Arthritis and Rheumatic Disorders

Francis J. Scully, M.D., Hot Springs, Ark. In ARCHIVES OF PHYSICAL MEDICINE, 26:4:238, April 1945.

Since many of the procedures employed at the spa can be carried out at home, the question naturally arises, "Why go to a spa or health resort for treatment?" It is true that the arthritic patient can take hot baths at home, but the spa offers more than just "hot baths." It gives regulated hydrotherapy. It is the proper application of heat that produces the best results. At the spa the patient will have the supervision of persons experienced in giving hot baths and other physical therapy procedures, who can apply them to give the most effective and beneficial results. It is for this reason that results are obtained at the spa that cannot be duplicated at home.

There are many spas and health resorts in the United States. According to the report of the Saratoga Springs Commission to the New York legislature in 1930, there are over two thousand areas where mineral springs are found. However, only a few have been developed for the treatment of patients; among these are Hot Springs National Park in Arkansas, Saratoga Springs in New York, Hot Springs in Virginia, French Lick in Indiana and Mount Clemens in Michigan. The patient should consult his physician, who after examining him will be able to advise him which spa will be most suitable.

It is evidence of the value of spa therapy that the United States Government is sending many of its soldiers in whom arthritis or other disorders have developed to spas for treatment. The Army and Navy General Hospital at Hot Springs National Park has been designated as the arthritis center for the United States Army.

Phantom Limb Pain: Its Relation to the Treatment of Large Nerves at Time of Amputation

L. G. Herrmann and E. W. Gibbs. In AMERICAN JOURNAL OF SURGERY, New York, Page 168, Feb. 1945.

Herrmann and Gibbs studied the phantom limb pain with the primary object of preventing irritation of the afferent pathways in the mixed nerves of the extremity at the time of amputation and during the immediate postoperative period by preventing abnormal scar tissue formation or the formation of neuromas at the site of division of the large nerve trunks. From January 1937 to January 1944 they performed 238 major amputations at the Cincinnati General Hospital and the Christian R. Holmes Hospital of the University of Cincinnati. The large nerve trunks were ligated with nonabsorbable material at a point about 1 inch above the site of amputation. The nerves were never crushed before the ligature was applied. The incidence of phantom limb pain in their series of 120 patients who were adequately studied after a major amputation was only 5.8 per cent. The analysis of the clinical data presented in this study indicates that the treatment of the large nerves at the time of amputation is of considerable importance in preventing the occurrence of phantom limb pain.

Spa Treatment and the Injured Workman

G. R. P. Aldred-Brown, M.A., D.M. Senior Physician, Royal National Hospital for Rheumatic Diseases, Bath, and J. Bastow, M.D., F.R.C.S. Assistant Orthopedic Surgeon to the Fracture Service, Royal United Hospital, Bath. In THE BRITISH JOURNAL OF PHYSICAL MEDICINE AND INDUSTRIAL HYGIENE, 8:2:36, March-April 1945.

To us spa treatment means treatment at a spa. Although the spas in Great Britain are few in number and although still fewer have the requisite medical and surgical skill combined with their hydrological facilities, spas should take a share in any national rehabilitation scheme. For large numbers of injured workmen the spa should be the accelerator of clinical progress and the means to ensure a rapid return to work.

Types of Injury Especially Responsive to Hydrotherapy

Group 1.—Injuries involving joints. Two examples may be given. (a) Internal derangements of the knee joint. Hydrotherapy is particularly valuable after meniscectomy when the sutures have been removed, in cases in which there is a tendency to effusion or local heat in the joint after exercise. Again, when there has been a pre-existent synovitis, whether from repeated traumata to a damaged cartilage, from early associated osteoarthritic changes or from severity of the initial injury, hydrotherapy often makes a complete success of an operation that might otherwise give disappointing results. (b) The "sprained" shoulder, usually associated with an incomplete tear of the supraspinatus muscle, and the shoulder stiff from periarticular adhesions which need to be broken down under an anesthetic. In both, the movements difficult to regain, namely those of abduction and backward extension of the shoulder, take place comparatively easily when assisted by the effect of the water. The patient soon regains confidence to persist with his exercises.

Group 2.—Complicated fractures, especially compound injuries with extensive muscle and tendon damage.

Group 3.—All cases after prolonged fixation in plaster. For example, after removal of a plaster spica applied for fixation of a compound fracture of the humerus or of the femur, there is always an awkward period when the injured man misses the support of the plaster. Associated soft-tissue injuries which have led to joint stiffness and muscular adhesions make it difficult for him to exercise the limb against gravity. The effect of immersion in a bath which eliminates this factor greatly assists his efforts to regain movement in his stiff joint, to exercise his weak muscles and to walk without external support. This has a result which is immediately beneficial to his morale.

Group 4.—Muscular and ligamentous injuries of the spine. These are often associated with anxiety states out of all proportion to the severity of the injury. The sense of well-being, absence of nocuous stimuli and ease of movement induced by the hot pool do much to alleviate the mental stress and encourage the man to regain free spinal movement. This is especially true after manipulation under anesthesia in order to break down adhesions.

Group 5.—Injuries complicated by paralysis. All paretic cases respond admirably to release from the drag of gravity. Two examples are deltoid paralysis after shoulder dislocation and foot-drop after external popliteal paralysis. The fact that a patient can often move a paretic limb in the water, when he is utterly unable to do so on dry land, causes him to look forward to his bath with pleasurable anticipation.

Conclusion

We submit that spa treatment based on hydrotherapy is ideal treatment for very many kinds of injury which may befall the workman; its efficacy secures his confidence and stimulates his desire for early recovery.

Factors Promoting Venous Return from the Arm in Man

E. Bowers, E. J. M. Campbell and C. H. P. Johnston, Students in the Department of Physiology, Middlesex Hospital Medical School, London. In THE LANCET, 15:1:461, April 14, 1945.

It seems likely therefore that under conditions of rest venous pressure in a limb is to a considerable extent governed by the tone of the small peripheral vessels. When this tone is diminished and the vessels are dilated, arterial pressure is transferred to the venous side more completely than when tone is high. The tone of the arterioles is in turn governed by the level of dilator metabolites, this depending on the degree of circulatory stagnation present.

A possible explanation of the control of the venous return from the extremities at rest thus presents itself. Slowing of blood-flow in the veins results in accumulation of metabolites, which by their direct action dilate the small vessels and allow more of the arterial pressure to be transferred to the veins; the rate of flow in the veins consequently increases.

In exercise an enormous increase in blood-flow through a limb (accompanied by vasodilatation) has been demonstrated by Grant (1938). Our experiments indicate that two factors are involved in venous return in exercise: (a) dilatation of peripheral vessels increases the vis a tergo, (b) the combination of venous valves and contracting muscles greatly facilitates the venous return.

1. Experiments were performed to obtain a quantitative estimate of two factors concerned in the mechanism of venous return.

2. The "muscle pump" alone can produce a venous pressure of at least 80 mm. Hg (104 cm. H_2O).

3. Venous pressure due to vis a tergo varies inversely with the state of peripheral vascular tone and can produce a venous pressure of at least 80 mm. Hg against gravity—i.e., 100 mm. Hg or 134 cm. H_2O effective pressure.

Causalgia: Report of Recovery Following Relief of Emotional Stress

Major Theodore Lidz and Captain Robert L. Payne, Jr., Medical Corps, Army of the United States. In ARCHIVES OF NEUROLOGY AND PSYCHIATRY, 53:3:224, March 1945.

The case appears to have contained all the essential components of the causalgia syndrome. The injury involved joints and peripheral nerves and resulted in the amputation of a finger. There was clear evidence of localized autonomic malfunction, as shown by the change in the color of the skin, edema, sweating and early trophic disturbance. There were acute hyperalgesia and constant burning pain, which was exacerbated by slight stimuli. The least movement was considered unbearable, and the fingers were kept motionless in a flexed position.

Evaluation of the Results of Treatment in Infantile Paralysis

Rustin McIntosh, M.D., Chairman; Carl E. Badgley, M.D.; Ralph K. Ghormley, M.D.; Don W. Gudakunst, M.D.; Andrew C. Ivy, M.D.; Howard T. Karsner, M.D.; Roger I. Lee, M.D., and Henry R. Viets, M.D. In THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, 128:1:21, May 5, 1945.

A second requisite for the fair comparison of two forms of treatment is equal sampling of cases. In this respect poliomyelitis affords unusual difficulty. A patient who is totally incapacitated at the height of his infection may recover so rapidly that within a few weeks no appreciable residuum persists. Injustice is done when one investigator, including in his series a number of early cases, claims credit for his results when compared with those of another investigator whose series comprises only cases showing residual paralysis two weeks or more after onset.

The Committee desires to put itself on record as being strongly in favor of the adoption in the field of the alternate case method, particularly the alternate paired case method, with age, severity of the attack and extent of paralysis being taken into account whenever any method of treatment is to be appraised.

It is therefore recommended that emphasis be placed on standardization of a scheme of muscle evaluation which can be widely applied by adequately trained physical therapy technicians, by orthopedists or by any physician willing to take the necessary training in the technic of the test. For the purpose of recording residual paralysis, common usage has demonstrated the resistance tests with and against gravity to be the most practicable. There is unanimity of use but diversity of nomenclature. The following terms are recommended as a standard to produce uniformity, and the following symbols are advised as a standard unit expression of muscle strength:

5 = N = Normal	= No apparent deficiency.
4 = G = Good	= Approximates normal but fatigues more readily.
3 = F = Fair	= Where part can perform function against gravity but is definitely weak.
2 = P = Poor	= Where muscle is so weakened that it cannot perform its function against gravity but with removal of gravity can function.
1 = T = Trace	= Where there is slight contractility of the muscle.
0 = O = Zero	= No evidence of contractility of muscle fibers.

Active Motion by Means of Occupational Therapy in the Treatment of Fractures

Lester Breidenbach, M.D., and Elizabeth Jamison, O.T., New York, N. Y. In SURGERY, GYNECOLOGY AND OBSTETRICS, 80:4:365, April 1945.

1. Occupational functional therapy is a distinct help in the treatment of injuries to the extremities. It rehabilitates the patient in the shortest possible time.

2. By means of the arthrometer and proper charting, progress becomes an accurate measurement rather than a guess.

3. Treatment is continuous and is carried out at the occupational clinic and at home.

4. Return to normal function is shortened in fractures of the extremities.

5. An accurate chart of all joint ranges is appended.

The Function of the Patella and the Effects of Its Excision

Herbert Haxton, B.Sc., Ch.M., F.R.C.S., Oxford, England. In SURGERY, GYNECOLOGY AND OBSTETRICS, 80:4:395, April 1945.

1. The patella is a sesamoid bone developed in and lying in the line of the extensor tendon of the knee.

2. Its phylogenetic and ontogenetic development indicate it probably has a function.

3. Experimental work shows that the patella improves the efficiency of knee extension in the more important extended positions of the knee joint by holding the patellar tendon away from the axis and thereby increasing the extending moment of the quadriceps pull.

4. Clinical investigations confirm the experimental findings.

5. Patellectomy is justifiable in patella-femoral osteoarthritis.

Massage—Physiologic Basis

C. Wesler Scull, Ph.D., Jenkintown, Pa. In ARCHIVES OF PHYSICAL MEDICINE, 26:3:167, March 1945.

General Considerations.—Overvigorous application of any physical agent may give rise to unfavorable results, and careful control is essential in administering. Like the prescription of rest, the prescription of massage should be made with respect to specifically desired effects and not as an ill defined blanket recommendation. Effective application of massage is so dependent on physical relaxation that rest may be regarded as a component part of massage in practice. As one of the purposes of massage is to direct the flow of blood to certain regions in amounts exceeding those required for immediate metabolic demands, opportunity must be allowed for blood so directed to achieve its intended functions. Obviously, to permit the subject of general massage to resume activity at once and thereby increase the rate of production of catabolites and the rate of oxygen consumption is to defeat the original purpose of treatment.

For the purposes indicated, however, massage provides an indispensable agency in control of significant features of many disease processes, including such diverse syndromes as poliomyelitis; anemia; arthritis; traumatic injuries, especially to joints; circulatory disorders, such as acroparaesthesia, Raynaud's disease, intermittent claudication and cardiac edema; chronic inactivity, particularly that of the elderly; neurasthenia, and other nervous conditions.

No drugs can accomplish the purposes of massage, nor can drugs, in general, be localized in their effects and directed with equal refinement to the particular parts concerned. The nucleus of physical therapy as a whole is the quartet of rest, heat, massage and exercise, and to these nothing has been added in principle since the days of the ancients, except irradiation involving roentgen rays and radium. "Laying on of hands" unfortunately has fallen into the wrong hands in many instances, but the renaissance now taking place in physical therapy promises that this oldest of healing arts will again come into its own.

Optimal effects from the application of massage can be secured only when this procedure is prescribed as an element of a well integrated therapeutic regimen and when it is administered with the technical skill of one familiar with the anatomic and physiologic features of the regions treated as well as the pathologic processes to which they are subject.

The Pathology of Trench Foot

Captain Nathan B. Friedman, M.C., from the Army Institute of Pathology, Washington, D. C. In AMERICAN JOURNAL OF PATHOLOGY, 21:3:409, May 1945.

Injuries due to cold have been known for many years but the study of such lesions always gains new impetus in wartime. In addition to frostbite and trench foot, which have been investigated in the past, new varieties of thermal gangrene in the form of high altitude frostbite of aviators and immersion foot of seamen have made their appearance in the present war. Through the cooperation of a number of medical officers, material from 14 cases of trench foot, which occurred in two different theaters of operation, has been received at the Army Institute of Pathology. The alertness of several contributors who realized the great importance of studying the early phases of the disease process made it possible to obtain tissue from soldiers who died of other causes while suffering from an incipient stage of trench foot. Study of this invaluable material in conjunction with tissue illustrating the intermediate phases and late sequelae has enabled a reasonable picture of the pathogenesis to be reconstructed.

Summary

The morphologic changes in 14 recent cases of trench foot have been presented. The conclusion has been reached that all injuries resulting from exposure to low temperatures exhibit a common pattern and result from a similar train of events.

The essential early change is a disturbance in the circulatory mechanism; the consequent stagnation of blood leads to thrombosis and, subsequently, to gangrene, which in many ways resembles ordinary peripheral ischemic necrosis complicated by secondary infection but has certain unusual features. Particular attention has been called to the occurrence of agglutinative thrombosis, profound changes in the fat, and interesting neuromuscular and osseous alterations. The delayed sensitivity to cold which follows apparent recovery may be caused in part by the damage to the subcutaneous panniculus and is certainly related to the occlusive peripheral vascular disease.

Further morphologic studies can contribute to an understanding of the pathogenesis of trench foot. Investigation of the early changes in the myelin sheaths and the fat of the subcutaneous panniculus will determine whether tissues rich in lipoid are specially sensitive to cold. Detailed examination of the sympathetic fibers which supply blood vessels and of the arteriovenous anastomoses will decide whether the initial lesion is vascular or neural.

Causalgia

Frank H. Mayfield, M.D., F.A.C.S., Major, M.C., A.U.S., Cincinnati, Ohio, and John W. Devine, M.D., F.A.C.S., Captain, M.C., A.U.S., Lynchburg, Virginia. In SURGERY, GYNECOLOGY AND OBSTETRICS, 80:6:635, June 1945.

In a study of 15 cases of causalgia the following observations were made:

1. Burning pain is a constant complaint and usually is immediate in onset.
2. The median or sciatic nerve was involved in each instance, and the lesion was incomplete.
3. Certain patients showed vasoconstriction in the causalgic limb; others showed vasodilatation.
4. The trophic changes and response to warm or cold moisture and to hyperthermia varied depending upon the blood flow.
5. Twelve patients were relieved by sympathectomy of the involved limb, one was cured by artificial fever therapy, and 2 recovered spontaneously.
6. Further observation as to the value of fever therapy will be made.
7. Direct surgical attack (neurolysis) upon the injured nerve which was performed on 5 cases, and periarterial sympathectomy at the level of injury, performed in 3, have not been of benefit.
8. Procaine block of the sympathetic chain affords complete relief temporarily and should be repeated 2 to 3 times, although no case in this series has had any lasting benefit from this procedure.
9. Sympathectomy (preganglionic) gave immediate and lasting relief to 12 patients.
10. The site of injury must be included in the sympathectomy.
11. Sympathectomy should be done early to prevent stiffness of joints due to disuse.
12. The personality changes always present during the painful stages are secondary to the pain. There is no evidence in our cases that there is a predisposing constitutional psychic factor in causalgia.

Rehabilitation of the Amputee

Henry H. Kessler, Captain (MC), U.S.N.R. In UNITED STATES NAVAL MEDICAL BULLETIN, 44:6:1199, June 1945.

The aim of medical and surgical treatment is the relief of symptoms and the restoration of working capacity. In the military service, return to duty is expedited by programs of physical conditioning, convalescent training and occupational therapy.

Physical Restoration

The first step in the rehabilitation process is that of physical restoration. This is accomplished by means of prosthesis. In the lower extremity the artificial leg serves two functions. It conceals the defect and it replaces the function that is lost. Psychosocial prejudice is thereby minimized while the ability of the amputee to discharge his work responsibilities approaches the normal.

In the case of the upper extremity, concealment of the defect is less adequate. Furthermore the function of the natural hand cannot be reproduced—only imitated. Psychologic prejudice and functional capacity are less adequately met. Nevertheless by means of prosthesis the patient's powers are improved.

The amputee is directed then to the four objectives: Social living, personal hygiene, transportation, and work capacity. These ends are achieved under a program of physical conditioning, occupational therapy, and convalescent training. Before the patient is discharged from this hospital he must satisfactorily pass an achievement test which includes the major elements of the aforementioned four objectives. The hand amputee must learn to dress and undress, tie his shoes, feed himself, lock and unlock a door, handle a key, write, manage a telephone, drive a car. The leg amputee must also pass an achievement test. He must learn how to drive a car, ride a horse, dance, bowl, swim, engage in other sports activities, climb a platform, and descend a ladder or stairs. These are not isolated activities but are carried along with other features of the rehabilitation program.

Though the objectives of personal care, transportation and social living are important, the major factor in the patient's successful rehabilitation will be his economic adjustment on his return to civil life. This phase of his adjustment is, therefore, emphasized in our program.

When Should the Poliomyelitis Patient Be Splinted?

Clarence H. Heyman, M.D. In THE OHIO STATE MEDICAL JOURNAL, 41:5:436, May 1945.

When should the poliomyelitis patient be splinted? If the intent of this question is to discuss the indications for absolute and uninterrupted and prolonged immobilization it can be answered in one short word "Never." Splinting in poliomyelitis is a loose term which has led to misinterpretation and abuse. A splint is a rigid device used for immobilization, and while a necessary piece of apparatus in the treatment of fractures and other miscellaneous conditions, it leads to atrophy, muscular weakness, interference with circulation, adhesions, bone atrophy, and other undesirable effects.

Therefore, we shall assume that it was the intent of the question to be, "When should the muscles of the poliomyelitis patient be protected?" for this is quite a different matter and cannot be answered so curtly. It depends upon many things among which are the degree and location of the muscular weakness, the amount of pain or muscle spasm, the condition of the ligaments supporting the joint, the relative strength of the opposing groups of muscles, the duration since the onset of the disease, and many other conditions. There are some patients who require no protection at all, and others who may require protection of muscles for years or the remainder of their lives.

John Hilton in his classic, "Rest and Pain," taught that pain was a symptom demanding rest. He had no use for massage, movements or exercise. Hugh Owen Thomas said, "I cannot find suitable cases upon which I would perform the deception known as passive motion." While undoubtedly they did not have particular reference to poliomyelitis their teaching in joint inflammations and injuries has prevailed to this day and are acceptable with reservations in the case of poliomyelitis. In other words, there can be an overdose of rest.

A careful and critical reexamination of our concepts regarding the treatment of the muscle in poliomyelitis leaves me convinced that we have been on the right track and that splinting or protection is of great importance. This, however, implies responsibility.

Definitive Surgical Management of Amputations

Henry H. Kessler, Captain (MC), U.S.N.R. In UNITED STATES NAVAL MEDICAL BULLETIN, 44:6:1148, June 1945.

The rehabilitation of the amputee begins with the decision of the surgeon to amputate. The future of the patient will depend in large measure on the site and character of the amputation. The guillotine amputation or the modified flap amputation is only a provisional procedure; the end sought by the final amputation is a stump that will properly carry the patient's weight and permit him to wear a prosthesis with comfort and utility.

The surgeon's work is not completed at the end of the operation. Two further duties remain to be performed. He must prepare the stump to receive the prosthesis and he must teach the patient to use it.

Shrinking.—Preparation of the stump means that the shape of the stump must be changed in order that it may be fitted properly with an artificial limb. The bulbous or edematous stump must be shrunk in order that it may become a narrow cone. This is done by the compression obtained from a tight elastic bandage that has been previously unwound and stretched. Shrinking also is obtained by the wearing of a pylon. Bandaging has the advantage that it can be started early, long before the stump can tolerate the pylon. The bandage is applied under great tension to the end of the stump, otherwise the stump becomes bulbous instead of conical. Bandaging is repeated several times a day, and if rigidly followed sufficient shrinking in from 4 to 6 weeks is obtained so that a permanent prosthesis may be applied. This goal is rarely reached without close scrutiny and supervision. The patient is apt to view the shrinking process with apathy, while the surgeon concentrates on the surgery and not on the aftercare.

Massage.—Massage of the stump is contraindicated. The freshly cut nerves will be too tender to withstand the trauma of manipulation and manual pressure. Physical therapy has no place in the aftercare of amputation stumps except in the management of contractures and in the employment of exercises.

Exercises.—Exercises are rarely necessary in leg amputations. They are required in thigh amputations, especially in short thigh stumps. The loss of the distal attachment of the adductor muscles causes overaction of the abductors. Development of the adductors and extensors of the hip is necessary in order to control the use of the prosthesis. The loss of the knee mechanism puts a double load on the hip extensors, that of extending the hip and the artificial limb.

Definitive surgical management is complete when final amputation has secured a stump of proper length and shape, adequately shrunk with good muscular control to receive and operate a prosthesis efficiently and with comfort.

Research Work on a More Precise Method of Determining Muscle Strength in Poliomyelitis Patients: A New Muscle Tester

Adolph A. Schmier, M.D., New York, N. Y. In JOURNAL OF BONE AND JOINT SURGERY, 27:2:326, April 1945.

Since minor changes in muscle strength are not readily detectable by the manual method of testing muscles, a muscle may gradually lose considerable power before the loss is recognized and the causative factor eliminated. When interval examinations with the scale method show a muscle to be weaker, the cause can be immediately investigated and corrected. By the scale method it will be possible to evaluate the comparative benefit derived from the various accepted forms of therapy presently in use. Small degrees of muscle imbalance, which if allowed to exist would produce deformities and contractures, may also be detected and corrected. In late cases of poliomyelitis, the value of accurate muscle testing may be important in determining indications for tendon transplantation.

The use of the scale method of testing muscle strength is not limited to infantile paralysis patients. The method can be employed in any condition of muscle weakness, if the full cooperation of the patient can be obtained, and he is willing to pull. It can be employed in cases of pseudohypertrophic muscular dystrophy, peripheral neuritis due to injury or disease, congenital myatonia, and cases of quadriceps weakness following such operations as knee-joint arthrotomies. Although a fairly large number of patients have been examined, it is felt that further clinical work along this line should be carried on. It would be advantageous to have the work performed more generally, so that as many cases as possible in the convalescent stage of poliomyelitis could be examined. By this means, a universal method of examining patients might be established. The apparatus described is not only useful for examining muscle strength, but can also be employed for isolated muscle-group exercises. Therefore, it is of value in treating as well as in testing poliomyelitic patients.

Surgical Therapy of Thrombosis of Deep Veins of Lower Extremities

J. Fine and A. Starr. In SURGERY, 17:153-318, Feb. 1945.

Fine and Starr show that heparin and dicumarol are useful but not thoroughly dependable agents for the prophylaxis of pulmonary embolism. Their use is furthermore complicated by hemorrhage in wounds and elsewhere, which has occasionally proved fatal. The surgical prophylaxis of pulmonary embolism is the procedure of choice among those who prefer a more direct and immediately applicable method for blocking the discharge of an embolus. The risks of ligation of the common femoral, the iliacs and possibly also the vena cava are minimal and are accompanied by little postoperative disturbance except for transitory increase in edema in occasional instances. The selection of the level of ligation is made on the basis of the extent of involvement: (a) The common femoral vein is ligated when thrombophlebitis is limited to the veins below the knee or when pulmonary embolism has occurred in the absence of all signs of involvement; (b) the common iliac is ligated when thrombophlebitis involves the common femoral, external or common iliac veins; (c) the vena cava is ligated when the indications are that both common iliacs require ligation. Since the frequency of bilateral involvement is high, bilateral vein ligation is generally indicated. The occurrence of spastic narrowing or obliteration of venous channels limits the diagnostic usefulness of venography. The distinction between quiet venous thrombosis and full blown thrombophlebitis, that is, phlegmasia alba dolens or milk leg, is not a dependable means of deciding when a clot is detachable and when it is not. Therefore, exploration in most cases of so-called milk leg is advisable. Early mobilization after operation does not provide full security against the development of thrombophlebitis.

Knee Injuries in Soldiers

L. H. Wilkinson, MB Edin., Major RAMC, H. A. Burt, MC Camb., MRCP, Captain RAMC, Specialists in Physical Medicine. In THE LANCET 1:22:685, June 2, 1945.

Treatment

Tender sites.—As a rule, tenderness of the semimembranosus insertion responds satisfactorily to physical treatment. Heat and friction on alternate days seem all that is required. After four treatments a noticeable improvement is apparent, and the patient often volunteers that he is better able to straighten his affected knee.

Physical methods are disappointing with the other sites of tenderness. An occasional exception is histamine or iodine ionization in cases of painful ligamentum patellae.

Effusion.—Effusion which develops after exercise often can be prevented if a compression bandage is applied directly after such exercise. The bandage should be retained until the next morning and reapplied after further similar activity.

Quadriceps insufficiency.—By the time the convalescent stage has been reached non-weight-bearing remedial exercises are the most useful means of treatment. Weights and pulleys are now popular, but as usually employed, with the patient sitting on a bench, they are unsatisfactory, as the exercise is often stopped with the knee short of full extension. The modification advocated by Duthie and MacLeod (1943), with the patient lying prone, is more satisfactory. Static contractions of the quadriceps are often poorly carried out with a tender ligamentum patellae, and the vastus internus, which is almost invariably the most wasted of the quadriceps group, cannot be correctly exercised when there is limitation of extension of the knee (Nicoll 1943). On rare occasions efforts at obtaining full extension are carried too far, and hyperextension is demonstrable, but this can sometimes be corrected by reeducation of the hamstrings.

Thermal Burns in Diabetes Mellitus

H. F. Root. In NEW ENGLAND JOURNAL OF MEDICINE, 232:267-300, March 8, 1945.

Root describes the metabolic changes which accompanied serious burns in 2 diabetic patients. A woman aged 66, who had undergone two leg amputations and who had diabetes of the typically mild degree often associated with gangrene, had not taken insulin regularly because her urine was sugar free with diet alone. The fasting blood sugar level had varied from 110 mg. to 210 mg. She entered the Deaconess Hospital with a second degree burn on the right arm and a large eschar on the left buttock. The blood sugar level was 480 mg. She received 195 units of insulin in the first two days. At first the burns showed no evidence of serious sepsis, but this later developed and she died on the nineteenth day. A man aged 35 had had diabetes for fifteen years, which likewise was mild and controllable by diet. As the result of a severe sunburn on the shoulders and back the skin became infected, with the formation of multiple carbuncles. He developed phlebitis and osteomyelitis and later prostatic and paranephric abscesses. When hospitalized he had to be given insulin. During the period when he suffered severe sunburn and carbuncles developed, his diet was not weighed or measured and the urine was not sugar free. The failure to control the diabetes may well have been an important factor encouraging the spread of infection.

Poliomyelitis Virus in Oropharynx

In JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, 128:5:389, June 2, 1945.

Howe and his collaborators state that poliomyelitis virus was recovered from half of 14 patients hospitalized in New Haven in 1943. In 20 cases studied in 1943 in New Haven and of 16 in Chicago the virus was recovered in 10, or 28 per cent. This figure gives little idea of the factors actually involved. In the 20 New Haven cases virus was isolated from 8 (40 per cent), while in the 16 cases of the Chicago series virus was found in only 2, or 12 per cent. This disparity is explained by the fact that in no instance was virus isolated after the third day of the disease. The apparently unfavorable result in the Chicago series was occasioned by the fact that two-thirds of the swabs were obtained between the fourth and the ninth day of illness, whereas two-thirds of the New Haven material was collected by the third day.

Exercises in Dysmenorrhea

John O. Haman, M.D., San Francisco, Calif. (From the Fertility and Endocrine Clinics, Free Hospital for Women, Brookline, Mass.) In AMERICAN JOURNAL OF OBSTETRICS AND GYNECOLOGY, 49:6:757. June 1945.

The exercises, which have been devised for the relief of dysmenorrhea, are very simple to perform; they take less than five minutes a day, and require a minimum of space; they may be done at home, and need be carried out usually for only two or three months before improvement results.

Position 1.—The patient stands at right angles to the

wall at such a distance as will enable her to comfortably rest her left elbow on the wall on a level with her shoulder. The pelvis is tilted forward and, while in this position, the patient touches the wall with her hip, keeping her knees straight. Care must be taken not to twist the body, or allow the elbow to slide up or down along the wall.

Position 2.—The same procedure is repeated using the right elbow.

Position 3.—The patient faces the wall against which she rests both elbows. The pelvis is tilted and the patient stretches until her pelvis touches the wall. The heels remain on the floor and the knees are kept straight.

Each position is assumed three times, and all are repeated three times a day.

The results are listed under three headings.

Satisfactory relief: Where the patient experienced 75 to 100 per cent relief from her pain and discomfort.

Partial relief: 25 to 75 per cent improvement.

No relief: 0 to 25 per cent improvement.

Coronary Occlusion After Fever Therapy

In JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, 128:5:386, June 2, 1945.

Harvey and Billings used fever therapy in the treatment of 85 young men with chronic gonococcic urethritis resistant to sulfonamide therapy. Three patients aged 24, 19 and 25 respectively developed electrocardiographic changes typical of occlusion of a coronary artery after fever theapy. In 1 case there were never any symptoms referable to the heart, and in the other 2 they were relatively mild and the illness was never serious. Electrocardiograms in each case showed progressive changes similar to those which occur with occlusion of the anterior descending branch of the left coronary artery. In 2 cases definite T wave changes were still present eight and ten weeks after the onset. In the third case a record made fifteen weeks after the therapeutic hyperpyrexia revealed normal T waves. Subsequently, in 15 cases, records were made routinely before and for three days after therapeutic hyperpyrexia. In 2 of these the electrocardiograms showed a coronary type of ST segment and T wave change within twenty-four hours, which persisted for several days but then reverted to normal. Neither patient had complaints referable to the cardiovascular system. In several others a transient cardiac arrhythmia was observed in addition to minor changes in the ST segments and T waves.

Section of Physical Medicine: The Management of Rheumatoid Arthritis

Francis Bach, D.M. In PROCEEDINGS OF THE ROYAL SOCIETY OF MEDICINE, 38:5:207, March 1945.

The four main clinical and pathological forms of rheumatism are rheumatic fever, the rheumatoid type of arthritis, the osteoarthritic type and nonarticular rheumatism or fibrositis.

Although these forms of rheumatism are differentiated it is the sick man and not the disease process that we are called upon to treat. People react in different ways to similar extraneous stimuli.

In brief it is my purpose to point out that the successful treatment of the early and active phases of rheumatoid arthritis is dependent on close cooperation between the patient and the medical staff. The latter may consist of a team as in the Rheumatic Unit or of one man as must often happen in general practice. The aim of treatment is to help the patient to increase his or her resistance by altering some of the constitutional and environmental pictures which cause ill-health and by this means to modify the clinical picture of the disease. Psychological, medical, physical and sociological measures play an important part in this achievement.

Observations on Muscle Spasm in Poliomyelitis: Electromyographic Studies on the Effects of Various Forms of Thermal Therapy and of Prostigmine

Arthur L. Watkins, M.D., and Mary A. B. Brazier, Ph.D., Boston. In ARCHIVES OF PHYSICAL MEDICINE, 26:6:328, June 1945.

1. Muscle spasm in patients with acute poliomyelitis was measured by quantitation of the electrical discharges released on five seconds of passive stretching by known weights.

2. The effect of twenty-minute applications of hot packs, infra-red radiation, luminous heat, short wave diathermy and the intramuscular injection of prostigmine (1.6 mg.) on this electrical component of spasm was tested.

3. Single applications of hot packs, infra-red radiation and diathermy had no effect.

4. Luminous heat and prostigmine caused a decrease in spasm of approximately 25 per cent. This degree of change was not great enough to indicate a specific effect on spasm.

5. Further studies on repeated use of a single method of treatment will be necessary for final evaluation.

The Management of Osteoarthritis

A. R. Neligan, M.D. In PROCEEDINGS OF THE ROYAL SOCIETY OF MEDICINE, 38:5:210, March 1945.

Indications for management.—The chief indications in the management of an established case of osteoarthritis are: (1) To secure the cooperation of the patient. (2) To ensure the best possible environment for him. (3) To remove etiological factors or, at least, lessen their effects. (4) To maintain function. (5) To relieve pain and improve the condition of the joint.

Rest periods are the single essential part of management in osteoarthritis.

Activity.—Most osteoarthritics are cheery, energetic folk, used to working hard and playing hard, so it is wise on general grounds to allow them as much activity as may be judged prudent.

Lastly weight reduction. The diet of the elderly should suit digestion and be well balanced. I think that is about all there is to say about the osteoarthritic unless he is overweight, as he, or rather she, very often is. Then drastic reduction is an excellent way of sparing spine and legs and may give dramatic all-round improvement.

Maintenance of function.—"Management" of general activity helps to preserve joint function in damaged joints, but something more is needed, namely, active stretching of the joint and active training of special muscle groups.

Treatment of the joints aims at relieving pain and improving the circulation, deficiency in which seems to be the one common factor in chronic rheumatic conditions; and, if arteriosclerosis is by no means regularly found in osteoarthritic joints, their owners are at an age when it is common.

Expert physical treatment gives opportunities for review.

The drawbacks of expert treatment may, however, from the point of view of many patients, be very real. It is a question too if the simple ways of applying heat mentioned are much less effective than our more complicated methods, except, perhaps, diathermy in the case of the hip and some forms of bath treatment includ-

ing the therapeutic pool, though, even here, domestic and local swimming baths may be turned to account.

Massage and exercises for the associated muscles, as well as general exercise, also improved the joint circulation and so should attention to varicose veins in the case of the lower limbs. However, fibrositis of muscles and joint capsules are the chief indications for massage in osteoarthritis.

Fibrositis

In BRITISH MEDICAL JOURNAL, No. 4404:775, June 2, 1945.

Increasing attention is being given to the problem of fibrositis, and the scepticism often expressed in the past as to its being a definite pathological entity is giving way under the pressure of such facts as those presented recently by Copeman and Ackerman. In spite of the difficulties imposed by active service conditions they have supported their clinical observations by research into the anatomy and pathology of fibrositis, by both necropsy and biopsy. Attention has been concentrated for a long time upon the painful nodules often met with in fibrositis. The histological characters were fully described by Stockman, though they have been sometimes described as structures found by the fingers of the physician but not by the surgeon's scalpel. Clinicians were reluctant to ascribe the pain and stiffness of fibrositis to these nodules, or to believe that organized fibrous structures could be broken down and the symptoms relieved by heavy massage.

The work of Sir Thomas Lewis on referred pain, amplified by Kellgren, who demonstrated the relation between localized tender spots and referred sciatic pain, aroused fresh interest, and Elliott threw further light on the matter by demonstrating that these spots were associated with areas of increased excitability in the corresponding segment of the spinal cord. Now Copeman and Ackerman have shown that these "trigger points" are associated with certain areas of the back where pink fatty tissue of a particular type lies between the superficial and the deep fascia. The fat is vascular and liable to become edematous and congested, possibly under the influence of meteorological and other influences, and may thus narrow the lumen of the tendon sheaths and cause stiffness and pain. A similar effect may arise in other situations, and this furnishes a far more convincing explanation of the characteristic symptoms of acute lumbago than many other theories. This underlying fat, when congested and swollen, tends to bulge through any weak spots or deficiencies in the enveloping fibrous layers or through the foramina which give passage to the nerves and blood vessels; these herniations form tender nodules and trigger points.

Epilation: A Fifteen Year Comparative Evaluation of Electrolysis and Electrocoagulation

Meyer Louis Niedelman, M.D., Philadelphia. In ARCHIVES OF PHYSICAL MEDICINE, 26:5:296, May 1945.

Summary and Conclusions

From my experience over a period of fifteen years with the use of various methods of epilation, especially electrolysis and electrocoagulation, I have come to the conclusion that the method of choice for epilation is electrocoagulation. The comparative advantages and disadvantages of electrolysis as compared with electrocoagulation have been discussed. As aids in technic, I have found coloring the finer and light hairs with mascara and hair rinse to be of value in showing the proper angle for insertion of the needle. Also, a method of demarcating the depth of the needle to be inserted is outlined. Electrodesiccation should not be attempted by the inexperienced.

Physical Medicine: Its Importance in Any Rehabilitation Program

Frederick A. Jostes, M.D., St. Louis, Mo. In SOUTHERN MEDICAL JOURNAL, 38:6:415, June 1945.

In closing let us not when this war is over forget our principles of rehabilitation as we did following the last war. Let us not forget a most important phase of rehabilitation—namely, the physical medicine phase of rehabilitation. Let us not let our future civilian and military patients suffer for the want of application of good sound principles of the practice of physical medicine in helping them to get well and fit quickly following illness and accident.

Book Reviews

The Recording of Sickness Absence in Industry. *By a Sub-Committee of the Industrial Health Research Board. Medical Research Council, Industrial Health Research Board Report No. 85. Paper. Price, 4d. Pp. 17. London: His Majesty's Stationery Office, 1944.*

This is a preliminary report showing the recording and analysis of sickness absence in industry as considered by the Industrial Health Research Board of the Medical Research Council of London.

Pastimes for the Patient. *By Marguerite Ichis. Illustrated by Reba Selden Esh. Cloth. Price, $3. Pp. 284. New York: A. S. Barnes and Company, 1945.*

Brigadier General Ralph G. De Voe, Commanding General of the Halloran General Hospital, says in his foreword that the author has here gathered together a number of expedients which have been tried and found effective as interesting, worthwhile projects that at the same time provide fun for the patient.

Each chapter is complete in itself and there is such diversity in the various chapters that it will appeal to those of widely different tastes and temperaments. The instructions and illustrations are clear and can be followed without other help. Each of the nineteen chapters of this book describes a craft, hobby or entertainment. Therefore, it will prove interesting to patients or anyone who is looking for a new interest or recreational activity.

Annual Review of Physiology. *James Murray Luck, Editor, Stanford University; Victor E. Hall, Associate Editor, Stanford University. Vol. VII Published by the American Physiological Society at Annual Reviews, Inc. Cloth. Price, $5. Pp. 774. Stanford University, Calif.: Annual Reviews, Inc., 1945.*

Again the editors of the Annual Review of Physiology have not only distinguished themselves but also have rendered a service to the whole field of medicine and surgery. It is no mean task to review the vast literature of physiology and to produce so valuable a volume. Physical medicine is so closely allied to physiology that a book of this type is indispensable to anyone working in this field. Some of the most valuable chapters in this volume for the physician interesed in the field of physical medicine are the physiologic effects of heat and cold, the peripheral circulation, muscle, the lymphatic system, electrical activity of the brain and exercise. Each chapter is written by a specialist in his particular field. Here is a volume crammed to the brim with thought provoking information that is invaluable to a proper understanding of the scientific aspect of physical medicine. It is highly recommended as a volume for every physician's library.

Manual of Military Neuropsychiatry. *Edited by Harry C. Solomon, M.D., Professor of Psychiatry, Harvard Medical School, and Paul I. Yakovlev, M.D., Walter E. Fernald State School, with the collaboration of other authorities. Cloth. Price, $6. Pp. 764, with illustrations. Philadelphia: W. B. Saunders Company, 1944.*

This manual is an outgrowth of a course of postgraduate lectures in neurology and psychiatry which included a review course in military neuropsychiatry. It was intended to be a reference book for medical officers during this present war. As such it must deal with certain subjects which would not ordinarily appear in a standard textbook and also it has been streamlined of much material which is debatable and academic.

The book is divided into six sections. First are discussed neuropsychiatric experiences of the last war and the general organization of neuropsychiatry in the army during this war. The second section deals with induction technics and principles. Section three is a highly enlightening group of topics concerning the administrative regulations regarding the disposition of neuropsychiatric casualties. In section four is a collection of selected clinical articles in which the attempt is made to cover only the commonest entities in military neuropsychiatry. Prophylaxis and therapy of psychiatric casualties are considered in section five. Finally, there is a group of special topics—such as neuropsychiatric disorders in the tropics, treatment of convoy and torpedo casualties, physiology of flying, electroencephalography, and so on.

The book is written by an illustrious group of contributors who have gained their reputations by much previous original work. Each chapter is concise and accurate. It makes a valuable addition to the current neuropsychiatric literature. Although it is recommended for medical officers it will undoubtedly prove to be a very useful book for civilian neuropsychiatrists because they must deal with many of these discharged casualties. The machinery of the services in dealing with these patients will help them to understand these patients more clearly.

The Mind of the Injured Man. *By Joseph L. Fetterman, M.A., M.D., Assistant Clinical Professor of Nervous Diseases, Western Reserve University School of Medicine, Cleveland, Ohio. Cloth. Price, $4. Pp. 260, with 28 illustrations. Chicago: Industrial Medicine Book Company, 1943.*

In this small book the author attempts to discuss the effect of trauma upon the function of the nervous system both physiologically and psychologically. It is intended for lay and medical readers and hence is written in fairly nontechnical language. The field of interest is pretty well covered in a smooth easy style which makes it simple reading. Even an interested attorney could understand the material which is an up-to-date point of view of practicing neuropsychiatrists.

There are chapters on anatomy of the brain and spinal cord, which—although superficial—are valuable. Pathology of trauma to the nervous system is discussed. Clinical entities as the result of trauma are amply described. Of greatest value is the author's able presentation of the mechanism of development of neurotic illness in relation to trauma. He clarifies the proper approach to assay the significance of trauma in the etiology of mental disease. The question of compensation also is discussed and the attitude is wholesome and on the side of justice—both for the patient and the defendant.

There is nothing particularly new in this book. However, the author has done a good job of presenting a complex subject in a direct manner. It obviously is the product of a good deal of experience. Its greatest value likely will be for those people other than medical personnel who deal with injured people and is highly recommended to them.

The Extremities. *By Daniel P. Quiring, Ph.D., Head, Anatomy Division, Cleveland Clinic, and Associate Professor of Biology, Western Reserve University, Cleveland, O.; Beatrice A. Boyle, Erna L. Boroush and Bernardine Lufkin. Paper. Price, $2.50. Pp. 55. Cleveland, O.: Cleveland Clinic Foundation, 1944.*

The set of plates prepared by Doctor Quiring and his associates serves to make clear, in diagrammatic fashion, the origin, insertion, action and arterial and nerve supply of the muscles of the upper and lower extremities. In addition, motor points are recorded. The plates make no attempt to illustrate all details of muscular attachment and innervation; they merely emphasize the major morphological features.

The text descriptions are brief, but they contain an account of the chief anatomic facts. They are supplemented by page references to the Gray and to the Cunningham. The nomenclature employed is based on modified B.N.A. and B.R. terminology.

The plates are conveniently arranged in a ringed binding which makes it possible to place them on the flat. In all there are 106 figures; 101 are concerned with the muscles including vessels and nerves of supply), one with the skeleton as a whole and four with the arteries and nerves apart from musculature.

In teaching gross anatomy to students in physical therapy it has been found that a brief guide is sorely needed—one which would consist of simplified figures and abbreviated text, and which would lead the students through the complexities or encyclopedic textbooks and lengthy atlases. It is believed that Quiring's volume will fulfil these requirements admirably.

Personality and the Behavior Disorders: A Handbook Based on Experimental and Clinical Research. *Edited by J. McV. Hunt, Assistant Professor of Psychology, Brown University, Providence, Rhode Island. Volumes I and II. Cloth. Price, $10 per set. Pp. 618; 619-1242, with illustrations. New York: The Ronald Press Company, 1944.*

The editor has collected a series of excellent articles dealing with the subject of personality. They are all original articles by eminent workers in the field of psychology and psychiatry.

The first volume is an elaborate discussion of the more theoretical and laboratory studies of the problem. The various personality tests are clearly evaluated. Studies on dynamics of behavior, conditioned reflexes, hypnotism, heredity and organic correlates of personality come in for a thorough discussion.

Volume two takes up the more strictly psychiatric aspects of the subject, even though some of the best articles are not contributed by psychiatrists. It considers the part played by social forces in interpersonal relationships in the determination of our behavior. There is a good section on some outstanding patterns of behavior disorder. Finally the editor has placed a review of psychiatric therapy and the prevention of personality disorders.

Great credit is due the individual contributors for their painstaking productions. Each article has an excellent arrangement and a thorough bibliography. The editor is to be complimented upon having achieved a much needed review of the subject of the personality disorders and arranged it in a logical comprehensible fashion. These two volumes can serve as a source of information for anyone dealing with psychiatry and its related fields.

Trauma in Internal Diseases With Consideration of Experimental Pathology and Medicolegal Aspects. *By Rudolf A. Stern, M.D., Assistant Attending Physician, City Hospital, New York City. Foreword by Francis Carter Wood, M.D., Director of Laboratories and Radiotherapy Department, St. Luke's Hospital, New York. Cloth. Price, $6.75. Pp. 575. New York: Grune and Stratton, 1945.*

Trauma as the cause of internal disease causes much controversy in medical testimonies. The role which trauma plays in surgical conditions is obvious; in internal disease it is extremely difficult to judge. There is no field in medicine that presents so many obscure phases, or in which it is so difficult to form sound opinions on a scientific basis as that on traumatically caused internal diseases. This problem is further complicated by the fact that in many instances important court decisions are based on the physician's opinion. Therefore, only a comprehensive knowledge of scientific literature will enable the medical witness to render sound testimony. This scientific literature is scattered in hundreds of periodicals so it is not easily accessible to the majority of practitioners. This monograph is valuable because it is a critical review of all this literature. It gives a series of critical case histories, especially those with exhaustive postmortem findings, and a description of the experimental work which has either confirmed or refuted the assumption of trauma as an etiological factor for many internal diseases.

This book is written by a physician of extremely wide experience in traumatic disease and in court practice. It should be in the library of every general practitioner who is interested in studying the effects of trauma among patients in his care. It is equally vital to those whose work deals largely with accident cases coming into the courts and with cases of alleged traumatic disease in which they must give testimony.

Manual of Human Cross Section Anatomy. *By Dudley J. Morton, M.D., Associate Professor, Department of Anatomy, College of Physicians and Surgeons, Columbia University. Second Edition. Cloth. Price, $6. Pp. 211, with illustrations. Baltimore: The Williams and Wilkins Company, 1944.*

Cross section anatomical studies form a natural link between basic instruction in anatomy and the clinical application of that knowledge. This book gives incompleted drawings of cross section studies of regional divisions of the body starting with the head. Opposite the drawings of each section is a list of the structures to be identified. For easy orientation, key figures are employed. Bones and muscles head the list because they comprise the essential landmarks against which the position of the smaller elements are determined and offer the greatest practical help in surgical approaches and diagnostic considerations.

The manual is adapted to use with the regular laboratory dissections. Color can be added to the drawings to emphasize topographic relationships.

An important feature of this revised second edition is the inclusion of blood vessels and nerves with appropriate guide lines for identification. Also charts for sensory areas in relation to cutaneous nerves and for arterial anastomoses about the larger joints have been added.

This atlas eliminates the usual arduous and time-consuming tracing of isolated sections. During the first stage of study the identifying numerals and necessary guide lines are inserted in pencil. Permanent markings with india ink are postponed until errors are eliminated.

The greatest value in this manual to the student lies in the personal recording of observation made during the course of study. No other method has the same power to keep alive or recall the observations the individual has personally made and recorded in his own manual.

Industrial Rehabilitation. *Paper. Price, 35 cents. Pp. 92. New York: American Museum of Safety and the Center for Safety Education, 1945.*

This booklet is a digest of industrial rehabilitation programs now operating in both large and small industries. Each program selected for the publication is described by its director. The booklet was prepared as the result of a study made of over 20 industries selected for their outstanding work in this important field. In addition, it points out the strengths and weaknesses of existing programs for employing physically disabled workers. It is not a survey of national practices and it does not attempt to offer any one solution to the rehabilitation problem.

Peripheral Nerve Injuries: Principles of Diagnosis. *By Webb Haymaker, Capt., M.C., A.U.S., Neuropathologist, The Army Institute of Pathology, Washington, D. C., (On leave of absence from the University of California, San Francisco and Berkeley); and Barnes Woodhall, Maj., M.C., A.U.S., Chief, Neurosurgical Section, Walter Reed General Hospital, Washington, D. C. (On leave of absence from Duke University, Durham, N. C.) Cloth. Price, $4.50. Pp. 227, with 225 illustrations. Philadelphia: W. B. Saunders Company, 1945.*

This monograph on peripheral nerve injuries reiterates not only what is well established, but gives new information that inevitably accrues from war. It is divided into three sections: the first deals with the principles of innervation; the second with examination of the patient; the third with the clinical features of plexus and peripheral nerve injuries.

This work is a valuable reference book for physical therapists. It explains the general principles of the composition of segmental nerve plexuses and peripheral nerves, the innervation of skin and muscles by spinal segments, the distribution of the peripheral nerves and the innervation of the skeleton and the disorders of bones and joints resulting from nerve injuries. It gives an analysis of the movements tested in a neurological examination. The common injuries to nerve plexuses and peripheral nerves are delineated with considerable emphasis placed on pertinent points of anatomy.

This monograph is highly recommended to medical officers of the armed forces, medical students and civilian physicians who will be required to treat peripheral nerve injuries.

Joan Chooses Occupational Therapy. *By Meta Cobb, O.T.R., and Holland Hudson. Cloth. Price, $2. Pp. 214. New York: Dodd, Mead & Company, 1944.*

This is one of the series known as the Dodd, Mead Career Books. Mrs. Cobb served as an occupational therapist during the last world war, and is now Executive Secretary of the American Occupational Therapy Association. Mr. Hudson is the author of a textbook on occupational therapy and is Treasurer of the American Occupational Therapy Association.

Why the heroine of this career book selected this important form of medical service, and how she was trained for her profession are discussed. This book should be read by every girl seeking a useful and interesting career.

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